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Present Worth Factors for Life-Cycle Cost Studies in the Department of Defense (1996)

Data for DoD compliance with the Federal Methodology for Life-Cycle Cost Analysis, Title 10, CFR, Part 436, Subpart A, and OMB Circular A-94

Stephen R. Petersen
Office of Applied Economics

Building and Fire Research Laboratory
Gaithersburg, Maryland 20899

Sponsored by:
The Federal Energy Management Program
U.S. Department of Energy
Washington, DC 20585

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ABSTRACT

This document provides 47 tables of present worth factors to be used in computing the present worth of future costs (or cost reductions) in economic analyses of design decisions for projects in the DoD Military Construction Program. These factors are especially useful for the life-cycle cost analysis of investments in buildings or building systems which are intended to reduce future operating, maintenance, repair, replacement, and energy costs over the life of the facility. The tables include present worth factors for both one-time costs and annually recurring costs, based on the FEMP discount rate of 4.1% (FY 1996) for energy-related studies and on the OMB discount rate of 4.6% and 4.9% for short-term and long-term non-energy studies, respectively. Forecasts of future energy prices used in the calculation of present worth factors for energy costs were provided by the Energy Information Administration.

PREFACE

On March 18, 1991, and again in March 1994, the Army, Navy, and Air Force signed a Memorandum of Agreement (MOA) on Criteria/Standards for Economic Analysis/Life-Cycle Costing for MILCON Design. The stated purpose of these MOAs is to establish criteria and standards for performing economic analyses (EAs) and life-cycle cost (LCC) studies in support of design decisions for projects in the Military Construction (MILCON) Program; i.e., to support the selection from various alternatives of components/systems being considered as elements in facilities design. Since 1991 the criteria/standards package represented by the provisions of the MOA has been adopted and specified for use in conjunction with several other Department of Defense (DoD) applications. For example, the Office of the Secretary of Defense has specified that EAs conducted in support of project-justification decisions for ECIP (Energy Conservation Investment Program) projects be based on this same criteria/standards package.

The criteria and standards in the MOA are responsive to, and consistent with, the requirements of 10 CFR 436 governing the economic analysis of investments in energy conservation and renewable energy resources for Federal facilities. However, the governing order for non-energy-related investments, OMB Circular A-94, was significantly revised in October 1992. Circular A-94 no longer specifies a single discount rate for economic analysis of Federal investments. Instead, Circular A-94 specifies two basic types of discount rates: (1) a discount rate for cost-effectiveness, lease-purchase, and related analyses; and (2) a discount rate for public investment and regulatory analyses. Only discount rates for the first type of analyses are included in this NIST report, since its primary purpose is to support cost-effectiveness studies related to the design and operation of DoD facilities.

OMB discount rates for cost-effectiveness and lease-purchase studies are based on interest rates on Treasury Notes and Bonds with maturities ranging from 3 to 30 years. Currently (as of January 1995) five maturities have been specifically identified by OMB, and are shown here with the corresponding real interest rate to be used as the discount rate for studies subject to Circular A-94:

Maturity:	<u>3-year</u>	<u>5-year</u>	<u>7-year</u>	<u>10-year</u>	<u>30-year</u>
Rate:	4.2%	4.5%	4.6%	4.8%	4.9%

For total study periods corresponding to these five maturities, Circular A-94 requires that the discount rates correspond to the rates shown. The total study period is the time between the Beneficial Occupancy Date and the end of study (the service period), *plus* the time between the Date of Study and the Beneficial Occupancy Date (the planning and construction period). For total study periods different from the five maturities shown, Circular A-94 does not specify the discount rate to be used. Although Circular A-94 allows for interpolation between the rates shown, such an approach is not practical for the simplified tabular approach used in this document. Accordingly, the enclosed tables have been developed for use primarily for long-term studies, defined here as those with total study periods exceeding 10 years. These data are based on a discount rate of 4.9%, corresponding to OMB's 30-year rate.

The tables have also been designed for use in support of short-term studies, defined here as those with total study periods of 10 years or less. For these types of studies, the present worth factors are based on a discount rate of 4.6%, corresponding to OMB's 7-year rate. Accordingly, for short-term studies with total study periods not close to seven years, the discount factors provided in the tables should be considered approximations only.

When more precise results are required, the present worth factors should be determined using a computer program specifically approved for DoD-construction design applications. The Life Cycle Cost in Design (LCCID) program, developed by the U.S. Army Corps of Engineers' Construction Engineering Research Laboratory (CERL) specifically for DoD-construction design applications, is recommended. The NIST Building Life Cycle Cost (BLCC) or DISCOUNT programs, developed for more general applications, are also acceptable. The NIST BLCC program (versions 4.3-96 or later) now provides ECIP reporting capabilities. Whichever computer program is used, it must be the most recent version of that program, which incorporates the latest DOE-projected energy price escalation rates and the discount rates for energy and non-energy studies.

The tables presented in this document are designed to be used in support of EAs/LCC studies conducted in accordance with the provisions of the MOA. These tables are considered to be valid and appropriate for all analyses/studies initiated during Fiscal Year 1996, and are authorized for use throughout that period. The present worth factors presented in the annually recurring cost tables are based on an assumed Date of Study (DOS) of April 1996. However, these factors should be sufficiently accurate for use at any time during that fiscal year.

The present worth factors in this report are consistent with those in NISTIR 85-3273-10, *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis 1996*, the Annual Supplement to NIST Handbook 135, *Life-Cycle Costing Manual for the Federal Energy Management Program*. However, the present worth factors for DoD studies are more specific as to the Date of Study and the Beneficial Occupancy Date than those in NISTIR 85-3273-10. The DoD factors for annually recurring costs assume that the Date of Study is April 1996 and that the Beneficial Occupancy Date occurs in October of the current year or in October of a future year (up to 2005). The DoD tables for annually recurring costs are based on a mid-year discounting convention for all annually-recurring costs, while the corresponding tables in NISTIR 85-3273-10 are based on an end-of-year discounting convention.

The same forecast of regional energy prices provided by the U.S. Department of Energy's Energy Information Administration (EIA) for NISTIR 85-3273-10 were used in computing the energy-type-specific tables in this report. However, with one exception, these tables are based on forecasts of energy prices for the industrial sector only, while the tables in NISTIR 85-3273-10 are based on residential, commercial, and industrial forecasts. Price forecasts for liquefied petroleum gas (LPG) in the residential sector were used for the DoD tables because industrial LPG price forecasts were not available from EIA.

For LCC analysis of Federal projects outside of the Department of Defense, especially those projects related to energy conservation and renewable energy resources, the present worth factors from NISTIR 85-3273-10 should be used. Note that the terms "present worth factor" (preferred by DoD) and "present value factor" (used in NISTIR 85-3273-10 and NIST Handbook 135) have identical meanings.

Both the CERL LCCID Program and the NIST Building Life-Cycle Program (BLCC), version 4.0 or later, can be used for the economic evaluation of MILCON design projects, consistent with the Tri-Service MOAs of 1991 and 1994. Both use the DOE projections of energy price increases (which are on the LCCID and BLCC disks) to calculate the present value of future energy costs. Both provide a capability for preparing ECIP reports. In addition, the NIST ERATES program (*A Computer Program for Calculating Time-of-Use, Block, and Demand Charges for Electricity Usage*, NISTIR 5186, July 1993) can be used to incorporate complex electricity rate schedules into a BLCC analysis of building energy use. A new NIST program, EMISS (*A Program for Estimating Local Air Pollution Emission Factors Related to Energy Use in Buildings*, NISTIR 5704, October 1995) enables BLCC to estimate reductions in local air pollution emissions attributable to energy conservation projects.

The annual update to Handbook 135, as well as NIST Handbook 135, BLCC, ERATES, and EMISS can be obtained from:

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Part I. Tables of Present Worth Factors for Energy Studies

Part I contains tables of present worth factors for use in computing the life-cycle costs of the competing alternatives in an energy-related study, in accordance with the provisions of governing DoD criteria (see Appendix A). These tables are all numbered in a sequence beginning with the letter "E" for energy. The DOE discount rate used to compute these present worth factors is 4.1% (*real*, i.e., net of general inflation). This is the discount rate specified for use in energy-related projects by the Federal Energy Management Program for Fiscal Year (FY) 1996.

Table E-1, "Present Worth Factors--One-Time Costs, Zero Differential Escalation," provides present worth factors for costs which occur one time or at irregular intervals throughout the study period. These costs include construction/acquisition costs, non-annually recurring maintenance costs, major repair and replacement costs, and retention/salvage value or disposal cost. These factors are called "single present worth" (SPW) factors. The present worth of each cost occurrence is found by multiplying that cost, in Date-of-Study (DOS) prices, by the SPW factor corresponding to the time of occurrence (years after DOS). Interpolation is encouraged for non-integer time periods.

Table E-2, "Present Worth Factors--Annually Recurring Non-Energy Costs, Zero Differential Escalation," provides present worth factors for all costs other than energy costs which are incurred annually throughout the study period in substantially the same amount each year (in constant dollar terms), such as routine maintenance and repair costs. These factors are called "uniform present worth" (UPW) factors. The factors in this table are based on the assumption that the DOS is in April 1996, the Beneficial Occupancy Date is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW factor. The number of payments generally corresponds to the number of years in the study period after the Beneficial Occupancy Date. Interpolation is encouraged for study periods and for beneficial occupancy dates other than those shown on the table.

Tables E-3-ET-R, where ET is the energy type code and R is the region number (R = 5 is for U.S. average), provide present worth factors for annually recurring energy costs. These factors are based on the assumption that annual energy usage/savings is constant from year to year, but that energy prices are changing over time, in accordance with the provisions of governing DoD criteria (see Appendix A). These factors are sometimes called "modified uniform present worth" (UPW*) factors. The UPW* factors in this table are based on the assumption that the DOS is in April 1996, the Beneficial Occupancy Date is in October of the same year or a future year, and that the annual energy cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of an annual energy cost over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW* factor. The number of payments generally corresponds to the number of years in the study period after the Beneficial Occupancy Date. Interpolation is encouraged for study periods and for Beneficial Occupancy Dates other than those shown on the tables.

Table E-1. Present Worth Factors - One-Time Costs
Zero Differential Escalation ($e = 0\%$)

Time Cost Incurred (Years after DOS)	SPW Factor	Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000	16	0.5258
0.25	0.9900	17	0.5051
0.50	0.9801	18	0.4852
0.75	0.9703	19	0.4661
		20	0.4477
1	0.9606	21	0.4301
2	0.9228	22	0.4131
3	0.8864	23	0.3969
4	0.8515	24	0.3812
5	0.8180	25	0.3662
6	0.7858	26	0.3518
7	0.7548	27	0.3379
8	0.7251	28	0.3246
9	0.6965	29	0.3118
10	0.6691	30	0.2996
11	0.6427	35	0.2450
12	0.6174	40	0.2004
13	0.5931	45	0.1640
14	0.5698	50	0.1341
15	0.5473		

Notes:

<1> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
Data Based on Discount Rate of 4.1% (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

ENERGY STUDIES : ALL REGIONS

ENERGY STUDIES : ALL REGIONS

Table E-2. Present Worth Factors--Annually Recurring Non-Energy Costs
Zero Differential Escalation ($e = 0\%$)

Number of Payments	Beneficial Occupancy Date											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9606	0.9228	0.8864	0.8515	0.8180	0.7858	0.7548	0.7251	0.6965	0.6691		
2	1.8834	1.8092	1.7380	1.6695	1.6038	1.5406	1.4799	1.4216	1.3656	1.3119		
3	2.7698	2.6607	2.5559	2.4553	2.3586	2.2657	2.1765	2.0907	2.0084	1.9293		
4	3.6214	3.4787	3.3417	3.2101	3.0837	2.9622	2.8456	2.7335	2.6258	2.5224		
5	4.4393	4.2645	4.0965	3.9352	3.7802	3.6313	3.4883	3.3509	3.2189	3.0922		
6	5.2251	5.0193	4.8216	4.6317	4.4493	4.2741	4.1057	3.9440	3.7887	3.6395		
7	5.9799	5.7444	5.5182	5.3008	5.0921	4.8915	4.6989	4.5138	4.3360	4.1652		
8	6.7050	6.4410	6.1873	5.9436	5.7095	5.4846	5.2686	5.0611	4.8618	4.6703		
9	7.4016	7.1101	6.8300	6.5610	6.3026	6.0544	5.8159	5.5869	5.3668	5.1555		
10	8.0707	7.7528	7.4475	7.1541	6.8724	6.6017	6.3417	6.0919	5.8520	5.6215		
11	8.7134	8.3702	8.0406	7.7239	7.4197	7.1275	6.8467	6.5771	6.3180	6.0692		
12	9.3309	8.9634	8.6103	8.2712	7.9454	7.6325	7.3319	7.0431	6.7657	6.4993		
13	9.9240	9.5331	9.1576	8.7970	8.4505	8.1177	7.7980	7.4908	7.1958	6.9124		
14	10.4937	10.0804	9.6834	9.3020	8.9357	8.5837	8.2457	7.9209	7.6089	7.3093		
15	11.0410	10.6062	10.1885	9.7872	9.4017	9.0314	8.6757	8.3340	8.0058	7.6905		
16	11.5668	11.1112	10.6736	10.2532	9.8494	9.4615	9.0889	8.7309	8.3870	8.0567		
17	12.0719	11.5964	11.1397	10.7009	10.2795	9.8746	9.4857	9.1121	8.7532	8.4085		
18	12.5570	12.0625	11.5874	11.1310	10.6926	10.2715	9.8669	9.4783	9.1050	8.7464		
19	13.0231	12.5102	12.0174	11.5441	11.0895	10.6527	10.2331	9.8301	9.4429	9.0710		
20	13.4708	12.9402	12.4306	11.9410	11.4707	11.0189	10.5849	10.1680	9.7676	9.3829		
21	13.9008	13.3533	12.8274	12.3222	11.8369	11.3707	10.9229	10.4927	10.0794	9.6824		
22	14.3140	13.7502	13.2087	12.6884	12.1887	11.7086	11.2475	10.8045	10.3790	9.9702		
23	14.7108	14.1314	13.5749	13.0402	12.5266	12.0333	11.5593	11.1041	10.6667	10.2466		
24	15.0920	14.4976	13.9267	13.3781	12.8512	12.3451	11.8589	11.3918	10.9431	10.5121		
25	15.4583	14.8494	14.2646	13.7028	13.1631	12.6447	12.1466	11.6682	11.2087	10.7672		
30	17.0840	16.4111	15.7648	15.1439	14.5474	13.9745	13.4241	12.8954	12.3875	11.8996		
35	18.4138	17.6886	16.9919	16.3227	15.6798	15.0623	14.4690	13.8992	13.3517	12.8259		
40	19.5016	18.7335	17.9957	17.2869	16.6061	15.9521	15.3238	14.7203	14.1405	13.5836		
45	20.3914	19.5883	18.8168	18.0757	17.3638	16.6799	16.0230	15.3919	14.7857	14.2033		
50	21.1192	20.2875	19.4884	18.7209	17.9836	17.2753	16.5949	15.9413	15.3134	14.7103		

Notes : <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards For EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table E-3-EL-1. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9546	0.9192	0.8865	0.8545	0.8232	0.7947	0.7682	0.7423	0.7166	0.6903		
2	1.8737	1.8056	1.7409	1.6776	1.6179	1.5629	1.5105	1.4589	1.4068	1.3544		
3	2.7602	2.6601	2.5641	2.4723	2.3860	2.3052	2.2270	2.1491	2.0709	1.9967		
4	3.6146	3.4833	3.3588	3.2405	3.1283	3.0217	2.9173	2.8132	2.7133	2.6201		
5	4.4378	4.2779	4.1270	3.9828	3.8449	3.7120	3.5814	3.4556	3.3367	3.2247		
6	5.2325	5.0461	4.8693	4.6994	4.5352	4.3761	4.2237	4.0790	3.9413	3.8085		
7	6.0007	5.7884	5.5858	5.3896	5.1993	5.0184	4.8472	4.6836	4.5251	4.3696		
8	6.7430	6.5050	6.22761	6.0537	5.8416	5.6419	5.4517	5.2674	5.0862	4.9089		
9	7.4595	7.1952	6.9402	6.6961	6.4650	6.2464	6.0356	5.8285	5.6255	5.4270		
10	8.1498	7.8593	7.5825	7.3195	7.0696	6.8302	6.5967	6.3678	6.1436	5.9249		
11	8.8139	8.5017	8.2060	7.9241	7.6534	7.3913	7.1359	6.8859	6.6415	6.4034		
12	9.4562	9.1251	8.8105	8.5079	8.2145	7.9306	7.6541	7.3838	7.1200	6.8632		
13	10.0797	9.7297	9.3944	9.0690	8.7538	8.4488	8.1519	7.8623	7.5797	7.3049		
14	10.6843	10.3135	9.9554	9.6082	9.2719	8.9466	8.6304	8.3220	8.0215	7.7295		
15	11.2681	10.8746	10.4947	10.1264	9.7698	9.4251	9.0902	8.7638	8.4461	8.1376		
16	11.8292	11.4139	11.0129	10.6243	10.2483	9.8849	9.5320	9.1884	8.8541	8.5296		
17	12.3684	11.9320	11.5107	11.1028	10.7081	10.3266	9.9565	9.5964	9.2462	8.9064		
18	12.8866	12.4299	11.9892	11.5625	11.1498	10.7512	10.3646	9.9885	9.6229	9.2684		
19	13.3844	12.9084	12.4490	12.0043	11.5744	11.1593	10.7567	10.3652	9.9850	9.6163		
20	13.8629	13.3681	12.8907	12.4289	11.9824	11.5513	11.1334	10.7273	10.3329	9.9506		
21	14.3227	13.8099	13.3153	12.8369	12.3745	11.9281	11.4954	11.0752	10.6671	10.2719		
22	14.7645	14.2345	13.7234	13.2290	12.7512	12.2901	11.8433	11.4095	10.9884	10.5806		
23	15.1890	14.6425	14.1154	13.6057	13.1133	12.6380	12.1776	11.7307	11.2972	10.8773		
24	15.5971	15.0346	14.4922	13.9678	13.4612	12.9723	12.4989	12.0395	11.5939	11.1624		
25	15.9892	15.4113	14.8542	14.3157	13.7955	13.2936	12.8076	12.3362	11.8789	11.4363		
30	17.7314	17.0856	16.4631	15.8617	15.2812	14.7214	14.1797	13.6548	13.1462	12.6543		
35	19.1592	18.4577	17.7817	17.1290	16.4992	15.8919	15.3048	14.7360	14.1854	13.6531		
40	20.3298	19.5827	18.8630	18.1682	17.4980	16.8518	16.2273	15.6227	15.0375	14.4720		
45	21.2896	20.5052	19.7496	19.0203	18.3169	17.6389	16.9838	16.3497	15.7363	15.1436		
50	22.0767	21.2617	20.4766	19.7191	18.9885	18.2843	17.6041	16.9459	16.3092	15.6942		

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-DO-1. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0136	1.0223	1.0107	0.9915	0.9698	0.9451	0.9223	0.9013	0.8840	0.8654
2	2.0359	2.0331	2.0022	1.9613	1.9148	1.8673	1.8235	1.7853	1.7494	1.7077
3	3.0467	3.0246	2.9720	2.9064	2.8371	2.7686	2.7075	2.6507	2.5917	2.5281
4	4.0382	3.9944	3.9171	3.8286	3.7384	3.6526	3.5729	3.4930	3.4120	3.3268
5	5.0080	4.9394	4.8394	4.7299	4.6224	4.5180	4.4153	4.3133	4.2108	4.1056
6	5.9530	5.8617	5.7406	5.6139	5.4878	5.3603	5.2356	5.1121	4.9896	4.8637
7	6.8753	6.7630	6.6246	6.4793	6.3301	6.1806	6.0344	5.8909	5.7477	5.5993
8	7.7766	7.6469	7.4900	7.3216	7.1504	6.9794	6.8132	6.6490	6.4833	6.3131
9	8.6606	8.5123	8.3323	8.1420	7.9492	7.7582	7.5712	7.3846	7.1971	7.0056
10	9.5260	9.3547	9.1527	8.9407	8.7280	8.5163	8.3068	8.0984	7.8896	7.6783
11	10.3683	10.1750	9.9515	9.7195	9.4861	9.2519	9.0206	8.7908	8.5623	8.3313
12	11.1886	10.9738	10.7303	10.4776	10.2217	9.9657	9.7131	9.4636	9.2153	8.9638
13	11.9874	11.7526	11.4883	11.2132	10.9355	10.6582	10.3858	10.1166	9.8478	9.5768
14	12.7662	12.5106	12.2239	11.9270	11.6280	11.3309	11.0388	10.7491	10.4608	10.1708
15	13.5243	13.2463	12.9377	12.6195	12.3007	11.9839	11.6713	11.3621	11.0548	10.7465
16	14.2599	13.9600	13.6302	13.2922	12.9537	12.6164	12.2843	11.9561	11.6304	11.3035
17	14.9736	14.6525	14.3029	13.9452	13.5862	13.2294	12.8784	12.5317	12.1875	11.8418
18	15.6661	15.3253	14.9559	14.5777	14.1992	13.8234	13.4540	13.0888	12.7257	12.3622
19	16.3389	15.9783	15.5884	15.1907	14.7932	14.3990	14.0110	13.6270	13.2462	12.8655
20	16.9919	16.6107	16.2014	15.7847	15.3688	14.9561	14.5493	14.1475	13.7495	13.3521
21	17.6244	17.2237	16.7955	16.3604	15.9259	15.4943	15.0698	14.6508	14.2360	13.8222
22	18.2374	17.8178	17.3711	16.9174	16.4641	16.0148	15.5730	15.1373	14.7062	14.2761
23	18.8314	18.3934	17.9281	17.4557	16.9846	16.5181	16.0596	15.6075	15.1601	14.7144
24	19.4070	18.9504	18.4664	17.9761	17.4879	17.0046	16.5297	16.0614	15.5984	15.1375
25	19.9641	19.4887	18.9869	18.4794	17.9744	17.4748	16.9836	16.4997	16.0215	15.5463
30	22.4827	21.9231	21.3390	20.7514	20.1687	19.5939	19.0303	18.4767	17.9315	17.3915
35	24.6018	23.9697	23.3160	22.6614	22.0139	21.3764	20.7524	20.1404	19.5387	18.9442
40	26.3844	25.6919	24.9797	24.2686	23.5666	22.8765	22.2016	21.5404	20.8912	20.2509
45	27.8845	27.1410	26.3797	25.6211	24.8732	24.1388	23.4211	22.7185	22.0294	21.3504
50	29.1468	28.3605	27.5578	26.7593	25.9728	25.2011	24.4473	23.7099	22.9872	22.2757

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
 Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-RO-1. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9901	0.9812	0.9698	0.9578	0.9513	0.9441	0.9301	0.9158	0.8998	0.8823
2	1.9713	1.9510	1.9276	1.9091	1.8955	1.8743	1.8459	1.8156	1.7821	1.7484
3	2.9411	2.9088	2.8789	2.8532	2.8256	2.7901	2.7457	2.6979	2.6482	2.5993
4	3.8988	3.8601	3.8230	3.7834	3.7414	3.6898	3.6280	3.5639	3.4991	3.4349
5	4.8502	4.8042	4.7532	4.6992	4.6412	4.5722	4.4941	4.4149	4.3347	4.2573
6	5.7943	5.7344	5.6689	5.5989	5.5235	5.4382	5.3450	5.2505	5.1571	5.0652
7	6.7245	6.6502	6.5687	6.4813	6.3896	6.2891	6.1806	6.0729	5.9650	5.8554
8	7.6402	7.5499	7.4511	7.3473	7.2405	7.1248	7.0030	6.8808	6.7552	6.6280
9	8.5400	8.4323	8.3171	8.1982	8.0761	7.9472	7.8109	7.6710	7.5278	7.3824
10	9.4223	9.2983	9.1680	9.0339	8.8985	8.7550	8.6011	8.4436	8.2822	8.1213
11	10.2884	10.1493	10.0037	9.8562	9.7064	9.5452	9.3737	9.1979	9.0211	8.8449
12	11.1393	10.9849	10.8260	10.6641	10.4966	10.3179	10.1281	9.9368	9.7446	9.5498
13	11.9750	11.8073	11.6339	11.4543	11.2692	11.0722	10.8670	10.6604	10.4496	10.2366
14	12.7973	12.6151	12.4241	12.2270	12.0235	11.8111	11.5906	11.3654	11.1364	10.9062
15	13.6052	13.4053	13.1968	12.9813	12.7624	12.5347	12.2955	12.0521	11.8060	11.5589
16	14.3954	14.1780	13.9511	13.7202	13.4860	13.2397	12.9823	12.7217	12.4587	12.1937
17	15.1681	14.9323	14.6900	14.4438	14.1910	13.9264	13.6519	13.3745	13.0935	12.8102
18	15.9224	15.6712	15.4136	15.1488	14.8778	14.5960	14.3046	14.0092	13.7100	13.4089
19	16.6613	16.3948	16.1186	15.8355	15.5474	15.2488	14.9394	14.6258	14.3087	13.9897
20	17.3849	17.0998	16.8053	16.5051	16.2001	15.8835	15.5559	15.2245	14.8895	14.5530
21	18.0899	17.7865	17.4749	17.1579	16.8349	16.5000	16.1546	15.8052	15.4527	15.0998
22	18.7766	18.4561	18.1276	17.7926	17.4514	17.0988	16.7354	16.3685	15.9996	15.6301
23	19.4462	19.1089	18.7624	18.4091	18.0501	17.6795	17.2986	16.9153	16.5298	16.1437
24	20.0989	19.7436	19.3789	19.0079	18.6309	18.2428	17.8455	17.4456	17.0435	16.6412
25	20.7337	20.3602	19.9777	19.5886	19.1941	18.7896	18.3758	17.9592	17.5409	17.1235
30	23.6398	23.1800	22.7124	22.2401	21.7646	21.2809	20.7900	20.2993	19.8096	19.3228
35	26.1310	25.5942	25.0525	24.5087	23.9640	23.4131	22.8571	22.3033	21.7524	21.2063
40	28.2632	27.6614	27.0565	26.4515	25.8475	25.2391	24.6274	24.0195	23.4162	22.8193
45	30.0892	29.4316	28.7727	28.1153	27.4605	26.8028	26.1434	25.4892	24.8410	24.2007
50	31.6530	30.9476	30.2424	29.5402	28.8418	28.1420	27.4416	26.7479	26.0612	25.3836

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-NG-1. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9517	0.9287	0.9197	0.9130	0.9213	0.9312	0.9274	0.9275	0.9236	0.9167
2	1.8804	1.8484	1.8327	1.8343	1.8525	1.8586	1.8549	1.8510	1.8403	1.8145
3	2.8001	2.7614	2.7540	2.7655	2.7799	2.7861	2.7784	2.7677	2.7380	2.6904
4	3.7131	3.6827	3.6852	3.6929	3.7073	3.7097	3.6952	3.6655	3.6140	3.5440
5	4.6344	4.6139	4.6126	4.6204	4.6309	4.6264	4.5929	4.5415	4.4676	4.3720
6	5.5656	5.5413	5.5401	5.5440	5.5476	5.5241	5.4689	5.3950	5.2955	5.1725
7	6.4930	6.4688	6.4636	6.4607	6.4454	6.4001	6.3224	6.2230	6.0961	5.9464
8	7.4205	7.3923	7.3803	7.3584	7.3213	7.2536	7.1504	7.0235	6.8700	6.6946
9	8.3441	8.3091	8.2781	8.2344	8.1749	8.0816	7.9509	7.7975	7.6182	7.4187
10	9.2608	9.2068	9.1541	9.0879	9.0029	8.8822	8.7249	8.5457	8.3423	8.1194
11	10.1585	10.0828	10.0076	9.9159	9.8034	9.6561	9.4731	9.2697	9.0429	8.7966
12	11.0345	10.9363	10.8356	10.7165	10.5773	10.4043	10.1972	9.9704	9.7202	9.4520
13	11.8880	11.7643	11.6361	11.4904	11.3256	11.1284	10.8978	10.6477	10.3755	10.0860
14	12.7160	12.5648	12.4101	12.2386	12.0496	11.8290	11.5751	11.3030	11.0096	10.6994
15	13.5165	13.3388	13.1583	12.9627	12.7503	12.5063	12.2304	11.9370	11.6230	11.2929
16	14.2905	14.0870	13.8823	13.6633	13.4276	13.1616	12.8645	12.5505	12.2165	11.8670
17	15.0387	14.8111	14.5830	14.3406	14.0829	13.7957	13.4779	13.1439	12.7906	12.4229
18	15.7628	15.5117	15.2603	14.9959	14.7169	14.4091	14.0713	13.7180	13.3465	12.9611
19	16.4634	16.1890	15.9156	15.6300	15.3304	15.0026	14.6454	14.2739	13.8847	13.4822
20	17.1407	16.8443	16.5497	16.2434	15.9238	15.5767	15.2013	14.8122	14.4058	13.9867
21	17.7960	17.4784	17.1631	16.8369	16.4979	16.1325	15.7396	15.3333	14.9103	14.4751
22	18.4301	18.0918	17.7565	17.4109	17.0538	16.6708	16.2607	15.8378	15.3987	14.9479
23	19.0435	18.6852	18.3306	17.9668	17.5920	17.1919	16.7652	16.3262	15.8715	15.4055
24	19.6369	19.2593	18.8865	18.5051	18.1132	17.6964	17.2536	16.7989	16.3291	15.8484
25	20.2110	19.8152	19.4248	19.0262	18.6177	18.1848	17.7263	17.2565	16.7720	16.2771
30	22.8192	22.3402	21.8691	21.3924	20.9080	20.4016	19.8720	19.3332	18.7818	18.2223
35	25.0360	24.4859	23.9458	23.4022	22.8532	22.2843	21.6940	21.0966	20.4886	19.8742
40	26.9187	26.3079	25.7092	25.1090	24.5051	23.8830	23.2414	22.5942	21.9380	21.2769
45	28.5174	27.8553	27.2068	26.5584	25.9078	25.2407	24.5554	23.8659	23.1688	22.4682
50	29.8751	29.1693	28.4785	27.7892	27.0991	26.3936	25.6712	24.9459	24.2141	23.4798

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-SC-1. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9699	0.9317	0.8864	0.8460	0.8048	0.7731	0.7451	0.7157	0.6898	0.6669
2	1.9015	1.8181	1.7324	1.6508	1.5779	1.5182	1.4608	1.4055	1.3567	1.3076
3	2.7880	2.6641	2.5372	2.4239	2.3230	2.2339	2.1506	2.0725	1.9974	1.9250
4	3.6340	3.4689	3.3103	3.1690	3.0387	2.9237	2.8176	2.7131	2.6148	2.5258
5	4.4388	4.2420	4.0554	3.8847	3.7285	3.5906	3.4582	3.3306	3.2156	3.1102
6	5.2119	4.9871	4.7712	4.5745	4.3954	4.2313	4.0756	3.9313	3.8000	3.6752
7	5.9569	5.7028	5.4609	5.2414	5.0361	4.8487	4.6764	4.5158	4.3650	4.2179
8	6.6727	6.3926	6.1279	5.8821	5.6535	5.4495	5.2609	5.0807	4.9077	4.7409
9	7.3625	7.0596	6.7686	6.4995	6.2543	6.0339	5.8258	5.6235	5.4307	5.2449
10	8.0294	7.7002	7.3860	7.1003	6.8387	6.5989	6.3685	6.1464	5.9346	5.7289
11	8.6701	8.3176	7.9867	7.6847	7.4037	7.1416	6.8915	6.6504	6.4187	6.1954
12	9.2875	8.9184	8.5712	8.2497	7.9464	7.6646	7.3955	7.1345	6.8852	6.6449
13	9.8883	9.5029	9.1362	8.7924	8.4694	8.1686	7.8796	7.6009	7.3347	7.0767
14	10.4727	10.0678	9.6789	9.3154	8.9733	8.6526	8.3460	8.0504	7.7665	7.4915
15	11.0377	10.6105	10.2019	9.8194	9.4574	9.1191	8.7955	8.4822	8.1813	7.8911
16	11.5804	11.1335	10.7058	10.3035	9.9239	9.5686	9.2273	8.8970	8.5809	8.2762
17	12.1034	11.6375	11.1899	10.7699	10.3734	10.0004	9.6421	9.2967	8.9660	8.6462
18	12.6073	12.1216	11.6564	11.2194	10.8052	10.4152	10.0417	9.6818	9.3360	9.0027
19	13.0914	12.5880	12.1058	11.6512	11.2200	10.8148	10.4269	10.0517	9.6924	9.3461
20	13.5579	13.0375	12.5376	12.0660	11.6196	11.2000	10.7968	10.4082	10.0359	9.6761
21	14.0074	13.4693	12.9524	12.4656	12.0047	11.5699	11.1533	10.7517	10.3659	9.9940
22	14.4392	13.8841	13.3521	12.8508	12.3747	11.9264	11.4967	11.0816	10.6838	10.3003
23	14.8539	14.2837	13.7372	13.2207	12.7312	12.2698	11.8267	11.3995	10.9901	10.5946
24	15.2536	14.6689	14.1071	13.5772	13.0746	12.5998	12.1446	11.7058	11.2844	10.8772
25	15.6387	15.0388	14.4636	13.9206	13.4046	12.9177	12.4509	12.0001	11.5670	11.1496
30	17.3565	16.6929	16.0555	15.4517	14.8781	14.3357	13.8155	13.3140	12.8330	12.3694
35	18.7745	18.0575	17.3694	16.7177	16.0979	15.5110	14.9479	14.4052	13.8844	13.3824
40	19.9498	19.1899	18.4606	17.7691	17.1109	16.4871	15.8883	15.3113	14.7574	14.2236
45	20.9258	20.1303	19.3667	18.6421	17.9521	17.2976	16.6693	16.0637	15.4824	14.9222
50	21.7364	20.9113	20.1192	19.3672	18.6507	17.9707	17.3178	16.6886	16.0845	15.5023

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

ENERGY STUDIES: REGION 1

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Table E-3-LP-1. Present Worth Factors--Liquified Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9849	0.9653	0.9410	0.9135	0.8873	0.8642	0.8365	0.8079	0.7841	0.7584
2	1.9502	1.9062	1.8544	1.8007	1.7514	1.7007	1.6444	1.5920	1.5426	1.4926
3	2.8911	2.8197	2.7417	2.6649	2.5879	2.5086	2.4286	2.3505	2.2768	2.2046
4	3.8046	3.7070	3.6059	3.5014	3.3958	3.2927	3.1870	3.0847	2.9888	2.8936
5	4.6919	4.5711	4.4424	4.3093	4.1800	4.0512	3.9212	3.7967	3.6777	3.5634
6	5.5560	5.4077	5.2503	5.0935	4.9384	4.7854	4.6332	4.4856	4.3476	4.2128
7	6.3926	6.2156	6.0344	5.8519	5.6726	5.4974	5.3222	5.1555	4.9970	4.8393
8	7.2005	6.9997	6.7929	6.5861	6.3846	6.1863	5.9920	5.8049	5.6234	5.4435
9	7.9846	7.7581	7.5271	7.2981	7.0736	6.8562	6.6414	6.4313	6.2276	6.0263
10	8.7430	8.4923	8.2391	7.9871	7.7434	7.5056	7.2678	7.0355	6.8105	6.5888
11	9.4772	9.2043	8.9280	8.6569	8.3928	8.1320	7.8720	7.6183	7.3729	7.1316
12	10.1892	9.8933	9.5979	9.3063	9.0192	8.7362	8.4549	8.1808	7.9158	7.6551
13	10.8782	10.5631	10.2473	9.9327	9.6235	9.3190	9.0173	8.7237	8.4392	8.1596
14	11.5480	11.2125	10.8737	10.5370	10.2063	9.8815	9.5602	9.2471	8.9438	8.6460
15	12.1974	11.8390	11.4779	11.1198	10.7688	10.4244	10.0836	9.7517	9.4301	9.1149
16	12.8239	12.4432	12.0607	11.6823	11.3116	10.9478	10.5882	10.2380	9.8991	9.5669
17	13.4281	13.0260	12.6232	12.2251	11.8351	11.4524	11.0745	10.7070	10.3511	10.0024
18	14.0109	13.5885	13.1661	12.7485	12.3396	11.9387	11.5435	11.1590	10.7865	10.4217
19	14.5734	14.1313	13.6895	13.2531	12.8260	12.4076	11.9955	11.5944	11.2059	10.8256
20	15.1162	14.6548	14.1940	13.7394	13.2949	12.8597	12.4309	12.0138	11.6098	11.2147
21	15.6397	15.1593	14.6804	14.2084	13.7469	13.2951	12.8503	12.4176	11.9988	11.5894
22	16.1442	15.6457	15.1493	14.6604	14.1824	13.7145	13.2542	12.8067	12.3735	11.9501
23	16.6306	16.1146	15.6014	15.0958	14.6017	14.1183	13.6432	13.1814	12.7342	12.2975
24	17.0995	16.5666	16.0368	15.5152	15.056	14.5074	14.0179	13.5421	13.0816	12.6321
25	17.5515	17.0021	16.4562	15.9191	15.3947	14.8821	14.3787	13.8895	13.4162	12.9542
30	19.5740	18.9498	18.3319	17.7255	17.1341	16.5570	15.9914	15.4423	14.9111	14.3934
35	21.2489	20.5625	19.8847	19.2204	18.5734	17.9426	17.3254	16.7266	16.1476	15.5839
40	22.6345	21.8965	21.1690	20.4570	19.7638	19.0888	18.4288	17.7890	17.1704	16.5686
45	23.7806	23.0000	22.2314	21.4797	20.7485	20.0368	19.3416	18.6677	18.0164	17.3830
50	24.7286	23.9127	23.1101	22.3257	21.5630	20.8209	20.0965	19.3945	18.7162	18.0567

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 1: ME, NH, VT, MA, CT, RI, NY, NJ, PA

Table E-3-EL-2. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9602	0.9228	0.8910	0.8614	0.8334	0.8037	0.7727	0.7434	0.7155	0.6887		
2	1.8830	1.8138	1.7525	1.6948	1.6371	1.5764	1.5160	1.4589	1.4042	1.3510		
3	2.7741	2.6752	2.5858	2.4985	2.4097	2.3197	2.2315	2.1475	2.0665	1.9889		
4	3.6355	3.5086	3.3895	3.2711	3.1531	3.0352	2.9202	2.8098	2.7044	2.6041		
5	4.4688	4.3123	4.1622	4.0145	3.8686	3.7239	3.5825	3.4478	3.3196	3.1976		
6	5.2725	5.0850	4.9056	4.7300	4.5573	4.3862	4.2204	4.0630	3.9131	3.7688		
7	6.0452	5.8283	5.6210	5.4187	5.2196	5.0241	4.8356	4.6565	4.4843	4.3169		
8	6.7886	6.5438	6.3097	6.0810	5.8575	5.6393	5.4291	5.2277	5.0324	4.8425		
9	7.5041	7.2325	6.9720	6.7189	6.4727	6.2328	6.0003	5.7757	5.5580	5.3469		
10	8.1927	7.8948	7.6100	7.3341	7.0662	6.8040	6.5484	6.3014	6.0624	5.8309		
11	8.8550	8.5327	8.2252	7.9276	7.6374	7.3521	7.0741	6.8058	6.5464	6.2951		
12	9.4930	9.1479	8.8186	8.4988	8.1855	7.8778	7.5784	7.2898	7.0106	6.7405		
13	10.1082	9.7414	9.3898	9.0469	8.7111	8.3821	8.0624	7.7539	7.4560	7.1678		
14	10.7016	10.3126	9.9379	9.5725	9.2155	8.8661	8.5266	8.1993	7.8833	7.5779		
15	11.2728	10.8607	10.4636	10.0769	9.6995	9.3303	8.9720	8.6267	8.2933	7.9713		
16	11.8209	11.3864	10.9680	10.5609	10.1637	9.7757	9.3993	9.0367	8.6868	8.3486		
17	12.3466	11.8907	11.4519	11.0251	10.6091	10.2030	9.8094	9.4302	9.0641	8.7107		
18	12.8510	12.3747	11.9161	11.4705	11.0364	10.6131	10.2028	9.8075	9.4262	9.0581		
19	13.3349	12.8389	12.3615	11.8978	11.4465	11.0065	10.5802	10.1696	9.7736	9.3913		
20	13.7991	13.2843	12.7889	12.3079	11.8399	11.3839	10.9422	10.5170	10.1068	9.7110		
21	14.2445	13.7116	13.1989	12.7013	12.2172	11.7459	11.2896	10.8502	10.4265	10.0178		
22	14.6719	14.1217	13.5923	13.0786	12.5793	12.0933	11.6228	11.1699	10.7333	10.3121		
23	15.0819	14.5151	13.9697	13.4407	12.9267	12.4265	11.9425	11.4766	11.0276	10.5945		
24	15.4753	14.8925	14.3318	13.7881	13.2599	12.7462	12.2493	11.7710	11.3100	10.8653		
25	15.8527	15.2545	14.6792	14.1213	13.5796	13.0530	12.5436	12.0534	11.5808	11.1252		
30	17.5218	16.8559	16.2155	15.5953	14.9938	14.4098	13.8453	13.3022	12.7791	12.2750		
35	18.8786	18.1576	17.4644	16.7936	16.1435	15.5129	14.9038	14.3178	13.7535	13.2099		
40	19.9818	19.2161	18.4800	17.7680	17.0785	16.4100	15.7645	15.1437	14.5459	13.9702		
45	20.8788	20.0768	19.3058	18.5604	17.8388	17.1395	16.4644	15.8152	15.1903	14.5884		
50	21.6083	20.7767	19.9774	19.2048	18.4570	17.7327	17.0336	16.3613	15.7143	15.0912		

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 <2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-DO-2. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0064	1.0090	0.9969	0.9813	0.9636	0.9413	0.9202	0.9017	0.8862	0.8692
2	2.0153	2.0059	1.9781	1.9448	1.9049	1.8615	1.8219	1.7879	1.7555	1.7164
3	3.0122	2.9871	2.9417	2.8862	2.8251	2.7632	2.7081	2.6572	2.6026	2.5418
4	3.9935	3.9507	3.8830	3.8063	3.7268	3.6494	3.5773	3.5043	3.4281	3.3466
5	4.9570	4.8920	4.8032	4.7080	4.6130	4.5187	4.4245	4.3298	4.2329	4.1324
6	5.8984	5.8122	5.7049	5.5943	5.4822	5.3658	5.2499	5.1346	5.0186	4.8982
7	6.8186	6.7139	6.5911	6.4635	6.3294	6.1913	6.0547	5.9203	5.7844	5.6420
8	7.7202	7.6001	7.4604	7.3107	7.1548	6.9961	6.8405	6.6861	6.5282	6.3643
9	8.6065	8.4694	8.3075	8.1361	7.9596	7.7818	7.6063	7.4299	7.2506	7.0658
10	9.4757	9.3165	9.1330	8.9409	8.7454	8.5476	8.3501	8.1523	7.9520	7.7479
11	10.3229	10.1420	9.9378	9.7267	9.5112	9.2914	9.0724	8.8537	8.6342	8.4106
12	11.1483	10.9468	10.7235	10.4924	10.2550	10.0138	9.7739	9.5358	9.2969	9.0530
13	11.9531	11.7325	11.4893	11.2362	10.9773	10.7152	10.4560	10.1985	9.9392	9.6760
14	12.7389	12.4983	12.2331	11.9586	11.6788	11.3973	11.1187	10.8409	10.5622	10.2802
15	13.5047	13.2421	12.9555	12.6601	12.3609	12.0601	11.7611	11.4639	11.1665	10.8657
16	14.2484	13.9645	13.6569	13.3422	13.0236	12.7024	12.3841	12.0681	11.7520	11.4326
17	14.9708	14.6659	14.3390	14.0049	13.6660	13.3254	12.9883	12.6536	12.3189	11.9812
18	15.6723	15.3480	15.0018	14.6472	14.2890	13.9297	13.5738	13.2206	12.8674	12.5118
19	16.3544	16.0107	15.6441	15.2703	14.8932	14.5152	14.1407	13.7691	13.3981	13.0252
20	17.0171	16.6531	16.2671	15.8745	15.4787	15.0821	14.6893	14.2997	13.9114	13.5218
21	17.6595	17.2761	16.8714	16.4600	16.0456	15.6306	15.2199	14.8131	14.4080	14.0018
22	18.2825	17.8803	17.4569	17.0269	16.5942	16.1613	15.7333	15.3097	14.8881	14.4655
23	18.8867	18.4658	18.0238	17.5754	17.1248	16.6746	16.2299	15.7898	15.3518	14.9134
24	19.4722	19.0328	18.5723	18.1061	17.6382	17.1712	16.7099	16.2535	15.7997	15.3460
25	20.0391	19.5813	19.1030	18.6194	18.1348	17.6513	17.1736	16.7013	16.2323	15.7642
30	22.6083	22.0657	21.5046	20.9403	20.3772	19.8177	19.2670	18.7243	18.1875	17.6539
35	24.7748	24.1590	23.5275	22.8955	22.2669	21.6442	21.0323	20.4305	19.8365	19.2477
40	26.6012	25.9243	25.2337	24.5446	23.8607	23.1846	22.5211	21.8695	21.2273	20.5919
45	28.1417	27.4131	26.6727	25.9353	25.2049	24.4838	23.7768	23.0831	22.4003	21.7256
50	29.4408	28.6688	27.8863	27.1083	26.3386	25.5795	24.8358	24.1067	23.3896	22.6818

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, NE, KS

Table E-3-RO-2. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9936	0.9863	0.9779	0.9705	0.9604	0.9481	0.9352	0.9204	0.9025	0.8859
2	1.9800	1.9643	1.9484	1.9309	1.9085	1.8832	1.8555	1.8228	1.7883	1.7564
3	2.9579	2.9347	2.9088	2.8789	2.8436	2.8036	2.7580	2.7087	2.6589	2.6113
4	3.9284	3.8951	3.8569	3.8141	3.7640	3.7061	3.6439	3.5792	3.5138	3.4530
5	4.8888	4.8432	4.7921	4.7345	4.6665	4.5919	4.5144	4.4342	4.3555	4.2823
6	5.8368	5.7784	5.7124	5.6370	5.5524	5.4624	5.3694	5.2759	5.1848	5.0967
7	6.7720	6.6987	6.6149	6.5228	6.4229	6.3174	6.2110	6.1052	5.9992	5.8940
8	7.6924	7.6012	7.5008	7.3933	7.2778	7.1591	7.0404	6.9196	6.7964	6.6741
9	8.5949	8.4871	8.3713	8.2483	8.1195	7.9884	7.8548	7.7168	7.5766	7.4373
10	9.4807	9.3576	9.2262	9.0900	8.9488	8.8028	8.6520	8.4970	8.3397	8.1855
11	10.3512	10.2126	10.0679	9.9193	9.7632	9.6000	9.4321	9.2601	9.0879	8.9178
12	11.2062	11.0542	10.8972	10.7337	10.5605	10.3802	10.1953	10.0083	9.8203	9.6318
13	12.0479	11.8835	11.7116	11.5309	11.3406	11.1433	10.9435	10.7407	10.5342	10.3284
14	12.8772	12.6979	12.5089	12.3111	12.1038	11.8915	11.6758	11.4546	11.2309	11.0082
15	13.6916	13.4952	13.2890	13.0742	12.8520	12.6239	12.3898	12.1513	11.9106	11.6711
16	14.4888	14.2753	14.0522	13.8224	13.5843	13.3378	13.0865	12.8310	12.5736	12.3161
17	15.2690	15.0385	14.8004	14.5548	14.2982	14.0345	13.7662	13.4940	13.2186	12.9422
18	16.0321	15.7867	15.5327	15.2687	14.9949	14.7142	14.4291	14.1390	13.8446	13.5504
19	16.7803	16.5190	16.2467	15.9654	15.6746	15.3772	15.0742	14.7650	14.4529	14.1412
20	17.5127	17.2330	16.9434	16.6451	16.3376	16.0222	15.7002	15.3732	15.0437	14.7151
21	18.2266	17.9297	17.6231	17.3081	16.9826	16.6482	16.3084	15.9641	15.6176	15.2718
22	18.9233	18.6094	18.2860	17.9531	17.6087	17.2565	16.8992	16.5379	16.1743	15.8113
23	19.6030	19.2723	18.9311	18.5791	18.2169	17.8473	17.4731	17.0947	16.7138	16.3340
24	20.2660	19.9174	19.5571	19.1873	18.8077	18.4212	18.0298	17.6341	17.2365	16.8404
25	20.9110	20.5434	20.1653	19.7782	19.3816	18.9779	18.5693	18.1568	17.7429	17.3315
30	23.8667	23.4125	22.9489	22.4774	21.9980	21.5138	21.0277	20.5404	20.0545	19.5733
35	26.4026	25.8709	25.3325	24.7889	24.2398	23.6879	23.1360	22.5851	22.0373	21.4962
40	28.5767	27.9792	27.3771	26.7718	26.1627	25.5527	24.9446	24.3390	23.7382	23.1457
45	30.4415	29.7878	29.1310	28.4727	27.8122	27.1524	26.4959	25.8435	25.1973	24.5607
50	32.0412	31.3391	30.6355	29.9318	29.2272	28.5246	27.8266	27.1340	26.4488	25.7744

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-NG-2. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9482	0.9212	0.9113	0.9107	0.9204	0.9361	0.9499	0.9618	0.9656	0.9655
2	1.8694	1.8325	1.8220	1.8311	1.8565	1.8860	1.9117	1.9275	1.9311	1.9159
3	2.7807	2.7433	2.7424	2.7673	2.8064	2.8479	2.8774	2.8929	2.8815	2.8474
4	3.6914	3.6636	3.6786	3.7172	3.7683	3.8135	3.8428	3.8434	3.8130	3.7556
5	4.6118	4.5998	4.6285	4.6790	4.7339	4.7933	4.7749	4.7749	4.7212	4.6345
6	5.5480	5.5497	5.5903	5.6446	5.6994	5.7294	5.7248	5.6831	5.6001	5.4839
7	6.4979	6.5115	6.5559	6.6101	6.6498	6.6609	6.6330	6.5620	6.4495	6.3057
8	7.4597	7.4772	7.5214	7.5605	7.5813	7.5691	7.5119	7.4114	7.2714	7.1009
9	8.4253	8.4426	8.4718	8.4920	8.4895	8.4480	8.3613	8.2332	8.0665	7.8711
10	9.3908	9.3930	9.4033	9.4003	9.3684	9.2974	9.1831	9.0284	8.8368	8.6172
11	10.3412	10.3246	10.3115	10.2791	10.2178	10.1193	9.9783	9.7986	9.5828	9.3388
12	11.2727	11.2328	11.1904	11.1285	11.0396	10.9144	10.7485	10.5446	10.3045	10.0377
13	12.1810	12.1117	12.0398	11.9504	11.8348	11.6847	11.4945	11.2663	11.0034	10.7145
14	13.0598	12.9610	12.8617	12.7456	12.6050	12.4307	12.2162	11.9652	11.6802	11.3699
15	13.9092	13.7829	13.6568	13.5158	13.3511	13.1523	12.9151	12.6420	12.3355	12.0044
16	14.7311	14.5781	14.4271	14.2618	14.0727	13.8512	13.5919	13.2974	12.9701	12.6188
17	15.5263	15.3483	15.1731	14.9835	14.7716	14.5280	14.2473	13.9319	13.5844	13.2143
18	16.2965	16.0943	15.8948	15.6824	15.4484	15.1834	14.8818	14.5463	14.1799	13.7913
19	17.0425	16.8160	16.5936	16.3592	16.1038	15.8180	15.4962	15.1417	14.7570	14.3506
20	17.7642	17.5149	17.2705	17.0145	16.7383	16.4323	16.0916	15.7188	15.3162	14.8924
21	18.4631	18.1917	17.9258	17.6491	17.3527	17.0278	16.6687	16.2780	15.8581	15.4175
22	19.1399	18.8470	18.5604	18.2635	17.9482	17.6049	17.2279	16.8199	16.3831	15.9261
23	19.7952	19.4816	19.1747	18.8589	18.5252	18.1641	17.7698	17.3449	16.8918	16.4189
24	20.4298	20.0960	19.7702	19.4360	19.0845	18.7060	18.2948	17.8536	17.3846	16.8963
25	21.0441	20.6914	20.3473	19.9952	19.6263	19.2310	18.8035	18.3464	17.8619	17.3587
30	23.8428	23.4033	22.9749	22.5409	22.0926	21.6201	21.1178	20.5881	20.0334	19.4620
35	26.2319	25.7176	25.2166	24.7124	24.1959	23.6575	23.0913	22.4997	21.8850	21.2556
40	28.2693	27.6911	27.1282	26.5640	25.9895	25.3948	24.7741	24.1297	23.4639	22.7850
45	30.0066	29.3739	28.7582	28.1429	27.5189	26.8762	26.2090	25.5197	24.8102	24.0891
50	31.4880	30.8088	30.1481	29.4893	28.8230	28.1394	27.4326	26.7049	25.9583	25.2011

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-SC-2. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Data											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct	2005	
1	0.9644	0.9300	0.8934	0.8616	0.8276	0.7889	0.7548	0.7279	0.7020	0.6770		
2	1.8944	1.8235	1.7550	1.6892	1.6165	1.5437	1.4828	1.4300	1.3790	1.3324		
3	2.7879	2.6850	2.5826	2.4781	2.3713	2.2716	2.1848	2.1070	2.0344	1.9717		
4	3.6494	3.5127	3.3715	3.2329	3.0993	2.9736	2.8618	2.7624	2.6737	2.5928		
5	4.4771	4.3015	4.1263	3.9608	3.8013	3.6506	3.5172	3.4016	3.2948	3.1962		
6	5.2659	5.0564	4.8543	4.6629	4.4783	4.3060	4.1565	4.0228	3.8982	3.7844		
7	6.0208	5.7843	5.5563	5.3399	5.1337	4.9453	4.7776	4.6261	4.4864	4.3516		
8	6.7487	6.4863	6.2333	5.9953	5.7730	5.5665	5.3810	5.2144	5.0536	4.8984		
9	7.4507	7.1633	6.8887	6.6345	6.3941	6.1698	5.9692	5.7816	5.6004	5.4275		
10	8.1277	7.8187	7.5279	7.2557	6.9975	6.7581	6.5364	6.3284	6.1295	5.9376		
11	8.7831	8.4580	8.1491	7.8590	7.5857	7.3252	7.0832	6.8574	6.6396	6.4293		
12	9.4224	9.0791	8.7525	8.4473	8.1529	7.8720	7.6123	7.3675	7.1314	6.9051		
13	10.0435	9.6825	9.3407	9.0144	8.6997	8.4011	8.1224	7.8593	7.6071	7.3638		
14	10.6469	10.2708	9.9079	9.5613	9.2288	8.9112	8.6141	8.3351	8.0658	7.8059		
15	11.2351	10.8379	10.4547	10.0903	9.7389	9.4030	9.0899	8.7937	8.5080	8.2337		
16	11.8023	11.3847	10.9838	10.6004	10.2306	9.8788	9.5486	9.2359	8.9357	8.6460		
17	12.3491	11.9138	11.4939	11.0922	10.7064	10.3374	9.9907	9.6637	9.3481	9.0435		
18	12.8782	12.4239	11.9856	11.5680	11.1651	10.7796	10.4185	10.0760	9.7456	9.4280		
19	13.3883	12.9157	12.4614	12.0266	11.6072	11.2073	10.8308	10.4735	10.1301	9.7987		
20	13.8800	13.3914	12.9201	12.4688	12.0350	11.6197	11.2283	10.8580	10.5007	10.1559		
21	14.3558	13.8501	13.3622	12.8966	12.4473	12.0172	11.6128	11.2286	10.8579	10.5015		
22	14.8145	14.2923	13.7900	13.3089	12.8448	12.4017	11.9834	11.5859	11.2035	10.8345		
23	15.2567	14.7200	14.2023	13.7064	13.2293	12.7723	12.3407	11.9314	11.5366	11.1556		
24	15.6844	15.1324	14.5998	14.0909	13.6000	13.1296	12.6863	12.2645	11.8576	11.4661		
25	16.0968	15.5299	14.9843	14.4615	13.9572	13.4751	13.0193	12.5856	12.1681	11.7663		
30	17.9522	17.3209	16.7119	16.1289	15.5676	15.0304	14.5223	14.0391	13.5738	13.1258		
35	19.5074	18.8239	18.1654	17.5346	16.9271	16.3451	15.7938	15.2687	14.7629	14.2757		
40	20.8221	20.0953	19.3950	18.7237	18.0770	17.4572	16.8693	16.3088	15.7688	15.2485		
45	21.9342	21.1708	20.4351	19.7296	19.0498	18.3979	17.7790	17.1886	16.6196	16.0713		
50	22.8750	22.0806	21.3149	20.5804	19.8726	19.1937	18.5486	17.9328	17.3393	16.7674		

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

ENERGY STUDIES: REGION 2

ENERGY STUDIES: REGION 2

Table E-3-LP-2. Present Worth Factors--Liquified Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9916	0.9808	0.9615	0.9383	0.9173	0.8965	0.8755	0.8507	0.8234	0.8039
2	1.9725	1.9424	1.8998	1.8556	1.8138	1.7719	1.7262	1.6741	1.6273	1.5891
3	2.9340	2.8807	2.8172	2.7521	2.6893	2.6226	2.5495	2.4780	2.4125	2.3499
4	3.8723	3.7980	3.7136	3.6276	3.5399	3.4460	3.3535	3.2632	3.1733	3.0887
5	4.7896	4.6945	4.5891	4.4783	4.3633	4.2500	4.1387	4.0240	3.9121	3.8104
6	5.6861	5.5699	5.4398	5.3017	5.1673	5.0352	4.8995	4.7628	4.6338	4.5131
7	6.5616	6.4206	6.2632	6.1056	5.9525	5.7960	5.6382	5.4845	5.3365	5.1923
8	7.4123	7.2440	7.0671	6.8908	6.7133	6.5347	6.3599	6.1872	6.0157	5.8486
9	8.2356	8.0479	7.8523	7.6516	7.4520	7.2564	7.0627	6.8663	6.6720	6.4829
10	9.0396	8.8331	8.6131	8.3903	8.1737	7.9591	7.7418	7.5227	7.3063	7.0963
11	9.8248	9.5940	9.3519	9.1120	8.8764	8.6383	8.3982	8.1570	7.9197	7.6893
12	10.5856	10.3327	10.0735	9.8148	9.5556	9.2946	9.0324	8.7704	8.5127	8.2621
13	11.3243	11.0544	10.7763	10.4939	10.2119	9.9289	9.6459	9.3634	9.0855	8.8153
14	12.0460	11.7571	11.4554	11.1503	10.8462	10.5423	10.2389	9.9362	9.6387	9.3494
15	12.7488	12.4363	12.1118	11.7845	11.4597	11.1354	10.8117	10.4894	10.1728	9.8652
16	13.4279	13.0926	12.7461	12.3980	12.0527	11.7081	11.3649	11.0235	10.6886	10.3631
17	14.0843	13.7269	13.3595	12.9910	12.6255	12.2613	11.8989	11.5393	11.1865	10.8432
18	14.7185	14.3403	13.9525	13.5638	13.1787	12.7954	12.4147	12.0372	11.6666	11.3060
19	15.3320	14.9334	14.5253	14.1170	13.7127	13.3112	12.9127	12.5173	12.1294	11.7525
20	15.9250	15.5061	15.0785	14.6510	14.2285	13.8091	13.3927	12.9801	12.5759	12.1831
21	16.4978	16.0593	15.6126	15.1668	14.7264	14.2892	13.8556	13.4266	13.0065	12.5982
22	17.0510	16.5934	16.1284	15.6648	15.2065	14.7521	14.3020	13.8571	13.4216	12.9983
23	17.5850	17.1092	16.6263	16.1448	15.6694	15.1985	14.7326	14.2723	13.8217	13.3840
24	18.1008	17.6071	17.1064	16.6077	16.158	15.6291	15.1477	14.6723	14.2073	13.7558
25	18.5988	18.0872	17.5692	17.0541	16.5464	16.0442	15.5478	15.0580	14.5792	14.1141
30	20.8338	20.2423	19.6471	19.0574	18.4774	17.9054	17.3417	16.7869	16.2452	15.7197
35	22.6951	22.0362	21.3760	20.7235	20.0830	19.4526	18.8327	18.2237	17.6299	17.0540
40	24.2423	23.5272	22.8128	22.1081	21.4173	20.7385	20.0718	19.4179	18.7806	18.1629
45	25.5281	24.7663	24.0070	23.2589	22.5262	21.8071	21.1017	20.4103	19.7369	19.0845
50	26.5967	25.7961	24.9994	24.2152	23.4478	22.6952	21.9575	21.2350	20.5317	19.8504

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 2: OH, IN, IL, MI, WI, MN, IA, MO, ND, SD, NE, KS

Table E-3-EL-3. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9603	0.9238	0.8890	0.8562	0.8264	0.7991	0.7715	0.7435	0.7165	0.6905		
2	1.8841	1.8128	1.7453	1.6826	1.6255	1.5706	1.5150	1.4600	1.4070	1.3560		
3	2.7731	2.6691	2.5717	2.4817	2.3970	2.3141	2.2315	2.1505	2.0725	1.9988		
4	3.6293	3.4955	3.3707	3.2532	3.1405	3.0306	2.9220	2.8160	2.7154	2.6203		
5	4.4557	4.2945	4.1422	3.9967	3.8570	3.7211	3.5875	3.4589	3.3369	3.2213		
6	5.2548	5.0660	4.8857	4.7132	4.5475	4.3866	4.2304	4.0804	3.9378	3.7999		
7	6.0263	5.8095	5.6023	5.4037	5.2130	5.0294	4.8518	4.6813	4.5164	4.3544		
8	6.7698	6.5261	6.2928	6.0692	5.8558	5.6509	5.4528	5.2599	5.0710	4.8859		
9	7.4863	7.2166	6.9582	6.7121	6.4773	6.2519	6.0314	5.8145	5.6024	5.3951		
10	8.1768	7.8820	7.6011	7.3335	7.0783	6.8304	6.5859	6.3459	6.1117	5.8833		
11	8.8423	8.5249	8.2226	7.9345	7.6568	7.3850	7.1174	6.8552	6.5998	6.3513		
12	9.4852	9.1464	8.8236	8.5131	8.2114	7.9165	7.6266	7.3433	7.0678	6.7997		
13	10.1067	9.7474	9.4021	9.0676	8.7429	8.4257	8.1148	7.8113	7.5162	7.2294		
14	10.7076	10.3259	9.9567	9.5991	9.2521	8.9139	8.5828	8.2597	7.9459	7.6413		
15	11.2862	10.8805	10.4881	10.1083	9.7403	9.3819	9.0312	8.6894	8.3578	8.0361		
16	11.8408	11.4119	10.9974	10.5965	10.2083	9.8303	9.4609	9.1013	8.7526	8.4146		
17	12.3722	11.9212	11.4856	11.0645	10.6567	10.2600	9.8728	9.4961	9.1311	8.7772		
18	12.8815	12.4094	11.9535	11.5129	11.0864	10.6719	10.2676	9.8746	9.4938	9.1248		
19	13.3696	12.8773	12.4019	11.9426	11.4983	11.0667	10.6461	10.2373	9.8413	9.4579		
20	13.8376	13.3258	12.8316	12.3545	11.8931	11.4452	11.0088	10.5848	10.1744	9.7772		
21	14.2860	13.7554	13.2435	12.7493	12.2716	11.8078	11.3563	10.9179	10.4937	10.0832		
22	14.7157	14.1673	13.6384	13.1278	12.6342	12.1553	11.6894	11.2372	10.7997	10.3766		
23	15.1276	14.5622	14.0168	13.4905	12.9817	12.4884	12.0087	11.5432	11.0931	10.6577		
24	15.5224	14.9406	14.3795	13.8380	13.3148	12.8077	12.3147	11.8366	11.3742	10.9270		
25	15.9009	15.3033	14.7270	14.1711	13.6341	13.1138	12.6081	12.1177	11.6436	11.1852		
30	17.5695	16.9026	16.2599	15.6402	15.0422	14.4633	13.9014	13.3573	12.8317	12.3241		
35	18.9190	18.1959	17.4995	16.8284	16.1811	15.5549	14.9478	14.3602	13.7931	13.2456		
40	20.0106	19.2423	18.5025	17.7898	17.1026	16.4382	15.7944	15.1718	14.5709	13.9912		
45	20.8939	20.0889	19.3140	18.5676	17.8482	17.1528	16.4794	15.8284	15.2003	14.5945		
50	21.6086	20.7740	19.9706	19.1970	18.4514	17.7311	17.0337	16.3597	15.7096	15.0826		

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-DO-3. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0199	1.0313	1.0206	1.0027	0.9821	0.9574	0.9347	0.9154	0.8990	0.8805
2	2.0512	2.0519	2.0232	1.9848	1.9395	1.8922	1.8501	1.8144	1.7796	1.7378
3	3.0717	3.0546	3.0053	2.9422	2.8742	2.8076	2.7492	2.6950	2.6369	2.5724
4	4.0744	4.0366	3.9627	3.8769	3.7897	3.7066	3.6297	3.5523	3.4714	3.3852
5	5.0565	4.9941	4.8975	4.7923	4.6887	4.5871	4.4870	4.3868	4.2843	4.1780
6	6.0139	5.9288	5.8129	5.6914	5.5692	5.4444	5.3215	5.1997	5.0771	4.9499
7	6.9487	6.8442	6.7119	6.5719	6.4265	6.2790	6.1344	5.9925	5.8490	5.6992
8	7.8641	7.7432	7.5924	7.4292	7.2611	7.0918	6.9272	6.7644	6.5982	6.4263
9	8.7631	8.6238	8.4498	8.2637	8.0739	7.8846	7.6991	7.5136	7.3253	7.1319
10	9.6436	9.4811	9.2843	9.0766	8.8667	8.6565	8.4483	8.2407	8.0310	7.8176
11	10.5009	10.3156	10.0972	9.8694	9.6386	9.4058	9.1755	8.9464	8.7166	8.4832
12	11.3355	11.1285	10.8899	10.6413	10.3879	10.1329	9.8811	9.6320	9.3823	9.1281
13	12.1483	11.9213	11.6619	11.3905	11.1150	10.8385	10.5667	10.2977	10.0272	9.7532
14	12.9411	12.6932	12.4111	12.1177	11.8206	11.5242	11.2324	10.9426	10.6523	10.3591
15	13.7130	13.4424	13.1382	12.8233	12.5063	12.1899	11.8773	11.5677	11.2582	10.9464
16	14.4623	14.1695	13.8438	13.5089	13.1719	12.8347	12.5024	12.1736	11.8454	11.5147
17	15.1894	14.8752	14.5295	14.1746	13.8168	13.4598	13.1083	12.7608	12.4138	12.0640
18	15.8950	15.5608	15.1952	14.8195	14.4419	14.0658	13.6956	13.3292	12.9630	12.5952
19	16.5807	16.2265	15.8401	15.4446	15.0478	14.6530	14.2639	13.8784	13.4942	13.1088
20	17.2464	16.8714	16.4652	16.0505	15.6351	15.2213	14.8132	14.4096	14.0079	13.6055
21	17.8912	17.4965	17.0711	16.6378	16.2034	15.7706	15.3444	14.9233	14.5046	14.0855
22	18.5163	18.1024	17.6583	17.2061	16.7527	16.3018	15.8580	15.4200	14.9846	14.5490
23	19.1223	18.6896	18.2266	17.7554	17.2839	16.8154	16.3547	15.9000	15.4480	14.9965
24	19.7095	19.2580	18.7759	18.2865	17.7975	17.3121	16.8347	16.3634	15.8956	15.4287
25	20.2778	19.8072	19.3071	18.8002	18.2942	17.7921	17.2982	16.8110	16.3277	15.8462
30	22.8486	22.2922	21.7085	21.1200	20.5349	19.9562	19.3886	18.8304	18.2789	17.7314
35	25.0127	24.3826	23.7279	23.0712	22.4201	21.7776	21.1484	20.5307	19.9217	19.3186
40	26.8341	26.1425	25.4282	24.7140	24.0073	23.3112	22.6301	21.9624	21.3049	20.6551
45	28.3677	27.6242	26.8598	26.0972	25.3438	24.6025	23.8777	23.1678	22.4695	21.7803
50	29.6590	28.8718	28.0652	27.2619	26.4690	25.6897	24.9281	24.1827	23.4501	22.7278

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996. Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-RO-3. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9916	0.9861	0.9795	0.9719	0.9618	0.9493	0.9363	0.9229	0.9090	0.8935
2	1.9777	1.9656	1.9514	1.9337	1.9110	1.8856	1.8592	1.8319	1.8026	1.7713
3	2.9573	2.9376	2.9132	2.8830	2.8473	2.8084	2.7682	2.7254	2.6804	2.6358
4	3.9292	3.8993	3.8625	3.8193	3.7702	3.7175	3.6617	3.6032	3.5448	3.4865
5	4.8909	4.8486	4.7988	4.7421	4.6792	4.6110	4.5395	4.4677	4.3956	4.3245
6	5.8402	5.7849	5.7216	5.6512	5.5728	5.4888	5.4040	5.3184	5.2335	5.1483
7	6.7765	6.7078	6.6307	6.5447	6.4506	6.3532	6.2547	6.1564	6.0573	5.9545
8	7.6994	7.6168	7.5242	7.4225	7.3150	7.2040	7.0927	6.9802	6.8635	6.7432
9	8.6084	8.5103	8.4020	8.2869	8.1658	8.0420	7.9165	7.7864	7.6522	7.5146
10	9.5019	9.3881	9.2664	9.1377	9.0037	8.8657	8.7227	8.5751	8.4237	8.2707
11	10.3797	10.2526	10.1172	9.9756	9.8275	9.6720	9.5114	9.3465	9.1797	9.0106
12	11.2442	11.1033	10.9552	10.7994	10.6337	10.4607	10.2828	10.1026	9.9196	9.7318
13	12.0949	11.9413	11.7789	11.6056	11.4225	11.2321	11.0389	10.8425	10.6408	10.4354
14	12.9329	12.7651	12.5851	12.3944	12.1939	11.9882	11.7788	11.5637	11.3444	11.1217
15	13.7567	13.5713	13.3739	13.1658	12.9499	12.7281	12.5000	12.2673	12.0307	11.7902
16	14.5629	14.3600	14.1453	13.9219	13.6898	13.4492	13.2036	12.9536	12.6993	12.4406
17	15.3516	15.1314	14.9014	14.6617	14.4110	14.1529	13.8899	13.6221	13.3496	13.0725
18	16.1230	15.8875	15.6413	15.3829	15.1146	14.8392	14.5584	14.2725	13.9815	13.6862
19	16.8791	16.6274	16.3624	16.0865	15.8009	15.5077	15.2088	14.9044	14.5953	14.2824
20	17.6190	17.3486	17.0660	16.7729	16.4695	16.1581	15.8406	15.5181	15.1915	14.8614
21	18.3402	18.0522	17.7524	17.4414	17.1198	16.7899	16.4544	16.1143	15.7705	15.4231
22	19.0438	18.7385	18.4209	18.0918	17.7517	17.4037	17.0506	16.6933	16.3321	15.9672
23	19.7301	19.4070	19.0713	18.7236	18.3655	17.9999	17.6296	17.2550	16.8763	16.4944
24	20.3987	20.0574	19.7031	19.3374	18.9617	18.5789	18.1913	17.7991	17.4035	17.0052
25	21.0490	20.6893	20.3169	19.9336	19.5407	19.1405	18.7354	18.3263	17.9142	17.5004
30	24.0315	23.5840	23.1251	22.6563	22.1797	21.6982	21.2146	20.7299	20.2449	19.7605
35	26.5891	26.0632	25.5286	24.9870	24.4397	23.8897	23.3397	22.7906	22.2431	21.6981
40	28.7806	28.1883	27.5893	26.9852	26.3774	25.7686	25.1617	24.5573	23.9564	23.3594
45	30.6596	30.0103	29.3561	28.6985	28.0387	27.3796	26.7238	26.0721	25.4252	24.7838
50	32.2705	31.5724	30.8709	30.1674	29.4630	28.7608	28.0631	27.3708	26.6846	26.0050

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-NG-3. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9606	0.9442	0.9407	0.9432	0.9436	0.9474	0.9548	0.9594	0.9576	0.9548
2	1.9048	1.8849	1.8840	1.8869	1.8910	1.9022	1.9142	1.9169	1.9124	1.8918
3	2.8455	2.8281	2.8276	2.8343	2.8458	2.8616	2.8718	2.8717	2.8494	2.8062
4	3.7887	3.7717	3.7750	3.7891	3.8052	3.8192	3.8265	3.8087	3.7637	3.7061
5	4.7323	4.7191	4.7298	4.7485	4.7628	4.7740	4.7636	4.7231	4.6637	4.5904
6	5.6798	5.6740	5.6892	5.7060	5.7176	5.7110	5.6779	5.6230	5.5480	5.4483
7	6.6346	6.6333	6.6467	6.6608	6.6546	6.6253	6.5778	6.5073	6.4059	6.2785
8	7.5939	7.5909	7.6015	7.5978	7.5689	7.5253	7.4621	7.3652	7.2361	7.0818
9	8.5515	8.5457	8.5385	8.5122	8.4689	8.4096	8.3201	8.1954	8.0394	7.8591
10	9.5063	9.4827	9.4529	9.4121	9.3532	9.2675	9.1502	8.9988	8.8167	8.6120
11	10.4433	10.3971	10.3528	10.2964	10.2111	10.0977	9.9536	9.7760	9.5696	9.3413
12	11.3577	11.2970	11.2371	11.1543	11.0413	10.9010	10.7308	10.5290	10.2989	10.0469
13	12.2576	12.1813	12.0950	11.9845	11.8446	11.6783	11.4838	11.2583	11.0045	10.7302
14	13.1419	13.0392	12.9252	12.7878	12.6219	12.4312	12.2131	11.9638	11.6878	11.3927
15	13.9998	13.8694	13.7285	13.5651	13.3748	13.1605	12.9186	12.6472	12.3503	12.0343
16	14.8300	14.6727	14.5058	14.3181	14.1041	13.8661	13.6020	13.3097	12.9919	12.6555
17	15.6333	15.4500	15.2588	15.0474	14.8097	14.5494	14.2645	13.9512	13.6131	13.2577
18	16.4106	16.2029	15.9881	15.7529	15.4930	15.2119	14.9060	14.5724	14.2152	13.8407
19	17.1635	16.9322	16.6936	16.4362	16.1555	15.8535	15.5273	15.1746	14.7982	14.4051
20	17.8929	17.6378	17.3769	17.0988	16.7971	16.4747	16.1294	15.7576	15.3626	14.9520
21	18.5984	18.3211	18.0395	17.7403	17.4183	17.0768	16.7124	16.3220	15.9096	15.4821
22	19.2817	18.9836	18.6810	18.3615	18.0205	17.6598	17.2768	16.8690	16.4397	15.9957
23	19.9442	19.6252	19.3022	18.9637	18.6035	18.2243	17.8238	17.3990	16.9533	16.4938
24	20.5858	20.2464	19.9044	19.5467	19.1679	18.7712	18.3538	17.9126	17.4514	16.9770
25	21.2070	20.8486	20.4874	20.1111	19.7148	19.3013	18.8674	18.4108	17.9345	17.4450
30	24.0336	23.5866	23.1406	22.6830	22.2078	21.7176	21.2093	20.6800	20.1328	19.5746
35	26.4499	25.9285	25.4098	24.8813	24.3374	23.7806	23.2079	22.6161	22.0084	21.3915
40	28.5129	27.9270	27.3459	26.7568	26.1542	25.5407	24.9129	24.2678	23.6085	22.9416
45	30.2730	29.6321	28.9976	28.3569	27.7043	27.0423	26.3676	25.6771	24.9737	24.2641
50	31.7746	31.0868	30.4069	29.7221	29.0268	28.3235	27.6087	26.8794	26.1384	25.3924

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-SC-3. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9700	0.9288	0.8893	0.8543	0.8260	0.8089	0.7821	0.7512	0.7217	0.6954
2	1.8988	1.8181	1.7436	1.6803	1.6349	1.5910	1.5333	1.4729	1.4171	1.3656
3	2.7882	2.6724	2.5696	2.4892	2.4170	2.3422	2.2550	2.1683	2.0872	2.0073
4	3.6425	3.4984	3.3785	3.2713	3.1682	3.0639	2.9504	2.8385	2.7290	2.6238
5	4.4684	4.3073	4.1606	4.0225	3.8899	3.7593	3.6205	3.4802	3.3454	3.2234
6	5.2774	5.0894	4.9118	4.7442	4.5853	4.4295	4.2623	4.0967	3.9450	3.8066
7	6.0594	5.8406	5.6335	5.4396	5.2555	5.0712	4.8787	4.6963	4.5282	4.3686
8	6.8107	6.5623	6.3289	6.1098	5.8972	5.6877	5.4783	5.2795	5.0902	4.9100
9	7.5323	7.2577	6.9991	6.7515	6.5136	6.2873	6.0615	5.8415	5.6317	5.4334
10	8.2278	7.9279	7.6408	7.3679	7.1133	6.8705	6.6235	6.3829	6.1550	5.9376
11	8.8979	8.5696	8.2573	7.9676	7.6965	7.4325	7.1650	6.9063	6.6593	6.4235
12	9.5396	9.1861	8.8569	8.5508	8.2584	7.9739	7.6883	7.4105	7.1452	6.8930
13	10.1561	9.7857	9.4401	9.1127	8.7999	8.4973	8.1926	7.8964	7.6147	7.3455
14	10.7557	10.3689	10.0021	9.6542	9.3232	9.0015	8.6785	8.3660	8.0671	7.7813
15	11.3389	10.9308	10.5435	10.1776	9.8275	9.4874	9.1480	8.8184	8.5030	8.2026
16	11.9009	11.4723	11.0669	10.6818	10.3134	9.9569	9.6004	9.2543	8.9242	8.6084
17	12.4424	11.9957	11.5711	11.1677	10.7829	10.4094	10.0363	9.6755	9.3301	8.9994
18	12.9657	12.4999	12.0570	11.6372	11.2353	10.8453	10.4575	10.0813	9.7211	9.3772
19	13.4700	12.9858	12.5265	12.0896	11.6712	11.2665	10.8634	10.4723	10.0989	9.7412
20	13.9558	13.4553	12.9790	12.5255	12.0924	11.6723	11.2544	10.8501	10.4629	10.0919
21	14.4254	13.9078	13.4149	12.9467	12.4983	12.0633	11.6322	11.2141	10.8136	10.4308
22	14.8778	14.3436	13.8361	13.3526	12.8893	12.4411	11.9962	11.5648	11.1524	10.7572
23	15.3137	14.7649	14.2419	13.7436	13.2671	12.8051	12.3469	11.9037	11.4789	11.0717
24	15.7349	15.1707	14.6329	14.1214	13.6311	13.1558	12.6857	12.2301	11.7934	11.3755
25	16.1408	15.5617	15.0107	14.4854	13.9818	13.4947	13.0122	12.5446	12.0972	11.6691
30	17.9631	17.3195	16.7052	16.1197	15.5590	15.0166	14.4817	13.9643	13.4688	12.9942
35	19.4850	18.7890	18.1249	17.4913	16.8841	16.2969	15.7185	15.1593	14.6233	14.1096
40	20.7653	20.0259	19.3199	18.6458	17.9995	17.3744	16.7596	16.1651	15.5950	15.0484
45	21.8429	21.0669	20.3257	19.6175	18.9383	18.2814	17.6359	17.0117	16.4129	15.8386
50	22.7499	21.9432	21.1722	20.4354	19.7285	19.0448	18.3734	17.7242	17.1013	16.5037

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-LP-3. Present Worth Factors--Liquified Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9869	0.9717	0.9486	0.9218	0.8974	0.8735	0.8494	0.8231	0.7954	0.7735
2	1.9586	1.9203	1.8705	1.8192	1.7709	1.7229	1.6725	1.6185	1.5689	1.5257
3	2.9072	2.8422	2.7679	2.6927	2.6203	2.5460	2.4679	2.3920	2.3211	2.2529
4	3.8291	3.7396	3.6413	3.5421	3.4434	3.3414	3.2414	3.1442	3.0483	2.9576
5	4.7265	4.6131	4.4907	4.3652	4.2388	4.1149	3.9936	3.8714	3.7530	3.6438
6	5.5999	5.4625	5.3138	5.1606	5.0123	4.8670	4.7208	4.5761	4.4392	4.3100
7	6.4493	6.2855	6.1093	5.9341	5.7644	5.5943	5.4255	5.2623	5.1054	4.9529
8	7.2724	7.0810	6.8828	6.6863	6.4917	6.2990	6.1117	5.9285	5.7483	5.5735
9	8.0679	7.8545	7.6349	7.4135	7.1964	6.9852	6.7779	6.5714	6.3689	6.1725
10	8.8414	8.6066	8.3622	8.1182	7.8826	7.6514	7.4208	7.1920	6.9679	6.7511
11	9.5935	9.3339	9.0669	8.8044	8.5488	8.2943	8.0414	7.7910	7.5466	7.3100
12	10.3208	10.0386	9.7531	9.4706	9.1917	8.9149	8.6404	8.3697	8.1055	7.8493
13	11.0255	10.7248	10.4193	10.1135	9.8123	9.5139	9.2191	8.9286	8.6448	8.3695
14	11.7117	11.3910	11.0621	10.7341	10.4113	10.0925	9.7780	9.4678	9.1649	8.8714
15	12.3779	12.0338	11.6827	11.3331	10.9899	10.6514	10.3172	9.9880	9.6668	9.3556
16	13.0207	12.6544	12.2818	11.9118	11.5488	11.1907	10.8374	10.4899	10.1510	9.8225
17	13.6413	13.2535	12.8604	12.4707	12.0881	11.7109	11.3393	10.9741	10.6179	10.2725
18	14.2404	13.8321	13.4193	13.0100	12.6083	12.2128	11.8235	11.4410	11.0679	10.7061
19	14.8190	14.3910	13.9586	13.5301	13.1102	12.6970	12.2904	11.8910	11.5015	11.1238
20	15.3779	14.9303	14.4788	14.0320	13.5944	13.1639	12.7404	12.3246	11.9192	11.5264
21	15.9172	15.4505	14.9806	14.5162	14.0613	13.6139	13.1740	12.7423	12.3219	11.9144
22	16.4374	15.9523	15.4649	14.9831	14.5113	14.0475	13.5917	13.1450	12.7098	12.2881
23	16.9392	16.4366	15.9318	15.4331	14.9449	14.4652	13.9944	13.5329	13.0835	12.6482
24	17.4235	16.9035	16.3818	15.8667	15.3626	14.8678	14.3823	13.9066	13.4436	12.9950
25	17.8904	17.3535	16.8153	16.2844	15.7652	15.2558	14.7560	14.2667	13.7905	13.3291
30	19.9822	19.3691	18.7575	18.1557	17.5679	16.9922	16.4286	15.8776	15.3419	14.8233
35	21.7186	21.0416	20.3683	19.7071	19.0621	18.4313	17.8147	17.2126	16.6277	16.0617
40	23.1578	22.4277	21.7033	20.9929	20.3005	19.6240	18.9634	18.3189	17.6933	17.0880
45	24.3505	23.5764	22.8097	22.0585	21.3268	20.6125	19.9154	19.2359	18.5764	17.9385
50	25.3390	24.5284	23.7266	22.9416	22.1773	21.4317	20.7044	19.9957	19.3082	18.6434

Notes: <1> Data Based on Assumed DOS of April 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 3: DE, MD, DC, VA, WV, NC, SC, GA, FL, KY, TN, AL, MS, AR, LA, OK, TX

Table E-3-EL-4. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Data											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9537	0.9186	0.8885	0.8591	0.8314	0.8098	0.7951	0.7796	0.7532	0.7286		
2	1.8723	1.8071	1.7476	1.6905	1.6412	1.6049	1.5747	1.5328	1.4819	1.4395		
3	2.7608	2.6662	2.5790	2.5003	2.4363	2.3845	2.3280	2.2614	2.1927	2.1305		
4	3.6199	3.4976	3.3888	3.2954	3.2159	3.1377	3.0566	2.9723	2.8837	2.8026		
5	4.4513	4.3074	4.1839	4.0750	3.9691	3.8663	3.7674	3.6633	3.5558	3.4541		
6	5.2611	5.1025	4.9635	4.8282	4.6978	4.5772	4.4584	4.3354	4.2073	4.0802		
7	6.0562	5.8821	5.7167	5.5569	5.4086	5.2682	5.1305	4.9869	4.8335	4.6835		
8	6.8358	6.6353	6.4454	6.2677	6.0996	5.9403	5.7820	5.6131	5.4367	5.2646		
9	7.5890	7.3639	7.1562	6.9587	6.7717	6.5918	6.4082	6.2163	6.0178	5.8243		
10	8.3177	8.0748	7.8472	7.6308	7.4232	7.2180	7.0114	6.7974	6.5775	6.3633		
11	9.0285	8.7658	8.5193	8.2823	8.0494	7.8212	7.5926	7.3571	7.1165	6.8825		
12	9.7195	9.4379	9.1708	8.9085	8.6526	8.4023	8.1522	7.8961	7.6358	7.3828		
13	10.3916	10.0894	9.7970	9.5117	9.2337	8.9620	8.6913	8.4154	8.1360	7.8646		
14	11.0431	10.7156	10.4002	10.0928	9.7934	9.5010	9.2105	8.9156	8.6179	8.3288		
15	11.6693	11.3188	10.9813	10.6525	10.3324	10.0203	9.7107	9.3975	9.0820	8.7760		
16	12.2725	11.8999	11.5410	11.1915	10.8517	10.5205	10.1926	9.8616	9.5292	9.2067		
17	12.8536	12.4596	12.0800	11.7108	11.3519	11.0023	10.6568	10.3088	9.9600	9.6217		
18	13.4133	12.9986	12.5993	12.2110	11.8338	11.4665	11.1039	10.7395	10.3749	10.0214		
19	13.9523	13.5179	13.0995	12.6929	12.2980	11.9137	11.5347	11.1545	10.7746	10.4064		
20	14.4716	14.0181	13.5814	13.1571	12.7451	12.3444	11.9496	11.5542	11.1596	10.7773		
21	14.9718	14.4999	14.0456	13.6042	13.1759	12.7594	12.3493	11.9392	11.5305	11.1345		
22	15.4537	14.9641	14.4927	14.0350	13.5908	13.1591	12.7343	12.3101	11.8878	11.4787		
23	15.9179	15.4113	14.9235	14.4499	13.9005	13.5441	13.1052	12.6674	12.2319	11.8102		
24	16.3650	15.8420	15.3384	14.8496	14.3755	13.9150	13.4625	13.0115	12.5634	12.1295		
25	16.7958	16.2570	15.7381	15.2346	14.7464	14.2723	13.8066	13.3430	12.8827	12.4370		
30	18.7236	18.1140	17.5269	16.9577	16.4062	15.8710	15.3466	14.8263	14.3115	13.8133		
35	20.3223	19.6540	19.0103	18.3865	17.7825	17.1967	16.6236	16.0564	15.4963	14.9545		
40	21.6480	20.9309	20.2403	19.5713	18.9237	18.2960	17.6824	17.0763	16.4788	15.9009		
45	22.7473	21.9898	21.2602	20.5538	19.8700	19.2075	18.5604	17.9220	17.2934	16.6856		
50	23.6588	22.8678	22.1059	21.3684	20.6547	19.9634	19.2885	18.6233	17.9689	17.3362		

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-DO-4. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0160	1.0228	1.0101	0.9895	0.9663	0.9450	0.9256	0.9055	0.8847	0.8621
2	2.0388	2.0329	1.9996	1.9558	1.9113	1.8706	1.8311	1.7902	1.7468	1.7012
3	3.0489	3.0223	2.9659	2.9008	2.8369	2.7761	2.7158	2.6523	2.5859	2.5199
4	4.0384	3.9886	3.9109	3.8264	3.7424	3.6608	3.5779	3.4914	3.4046	3.3190
5	5.0046	4.9337	4.8365	4.7319	4.6271	4.5229	4.4170	4.3100	4.2037	4.0994
6	5.9497	5.8593	5.7420	5.6166	5.4892	5.3621	5.2357	5.1092	4.9841	4.8597
7	6.8753	6.7647	6.6267	6.4787	6.3283	6.1807	6.0348	5.8896	5.7444	5.5979
8	7.7808	7.6495	7.4888	7.3178	7.1470	6.9798	6.8152	6.6499	6.4826	6.3146
9	8.6655	8.5115	8.3279	8.1365	7.9461	7.7602	7.5755	7.3881	7.1993	7.0104
10	9.5276	9.3507	9.1466	8.9356	8.7265	8.5205	8.3137	8.1048	7.8951	7.6867
11	10.3667	10.1693	9.9457	9.7160	9.4868	9.2587	9.0304	8.8006	8.5714	8.3436
12	11.1853	10.9684	10.7261	10.4763	10.2250	9.9754	9.7262	9.4769	9.2283	8.9806
13	11.9844	11.7489	11.4864	11.2145	10.9417	10.6712	10.4025	10.1338	9.8653	9.5983
14	12.7649	12.5091	12.2246	11.9312	11.6375	11.3475	11.0594	10.7708	10.4830	10.1967
15	13.5252	13.2474	12.9413	12.6270	12.3138	12.0044	11.6964	11.3885	11.0815	10.7769
16	14.2634	13.9641	13.6371	13.3033	12.9707	12.6414	12.3141	11.9869	11.6616	11.3390
17	14.9801	14.6598	14.3134	13.9602	13.6077	13.2591	12.9125	12.5671	12.2237	11.8823
18	15.6758	15.3362	14.9703	14.5972	14.2254	13.8576	13.4927	13.1292	12.7670	12.4074
19	16.3522	15.9931	15.6073	15.2149	14.8239	14.4378	14.0548	13.6725	13.2922	12.9154
20	17.0091	16.6301	16.2250	15.8133	15.4040	14.9998	14.5981	14.1976	13.8001	13.4067
21	17.6461	17.2477	16.8234	16.3935	15.9661	15.5431	15.1232	14.7056	14.2914	13.8815
22	18.2638	17.8462	17.4036	16.9556	16.5094	16.0683	15.6312	15.1969	14.7662	14.3401
23	18.8622	18.4264	17.9657	17.4989	17.0346	16.5762	16.1225	15.6717	15.2248	14.7833
24	19.4424	18.9884	18.5090	18.0240	17.5425	17.0675	16.5973	16.1303	15.6680	15.2116
25	20.0044	19.5317	19.0341	18.5320	18.0338	17.5423	17.0559	16.5735	16.0963	15.6252
30	22.5470	21.9896	21.4100	20.8282	20.2523	19.6855	19.1262	18.5731	18.0274	17.4900
35	24.6901	24.0598	23.4096	22.7592	22.1172	21.4864	20.8654	20.2526	19.6493	19.0564
40	26.4910	25.7990	25.0891	24.3812	23.6836	22.9991	22.3262	21.6634	21.0117	20.3721
45	28.0037	27.2598	26.4999	25.7436	24.9992	24.2696	23.5532	22.8483	22.1560	21.4772
50	29.2743	28.4868	27.6848	26.8879	26.1043	25.3368	24.5838	23.8436	23.1172	22.4054

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-RO-4. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9909	0.9828	0.9721	0.9623	0.9518	0.9377	0.9232	0.9071	0.8895	0.8706
2	1.9737	1.9549	1.9344	1.9141	1.8895	1.8609	1.8303	1.7966	1.7601	1.7249
3	2.9459	2.9172	2.8862	2.8518	2.8127	2.7680	2.7198	2.6672	2.6144	2.5627
4	3.9082	3.8690	3.8239	3.7750	3.7198	3.6575	3.5904	3.5215	3.4522	3.3863
5	4.8600	4.8067	4.7472	4.6821	4.6093	4.5281	4.4447	4.3593	4.2758	4.1975
6	5.7977	5.7300	5.6542	5.5716	5.4800	5.3824	5.2825	5.1828	5.0870	4.9921
7	6.7209	6.6370	6.5437	6.4423	6.3342	6.2202	6.1061	5.9941	5.8816	5.7691
8	7.6280	7.5265	7.4144	7.2965	7.1720	7.0438	6.9173	6.7887	6.6586	6.5286
9	8.5175	8.3972	8.2686	8.1343	7.9956	7.8550	7.7119	7.5657	7.4181	7.2708
10	9.3881	9.2514	9.1065	8.9579	8.8068	8.6496	8.4889	8.3252	8.1603	7.9977
11	10.2424	10.0893	9.9300	9.7691	9.6014	9.4266	9.2484	9.0674	8.8872	8.7084
12	11.0802	10.9128	10.7413	10.5637	10.3784	10.1861	9.9906	9.7942	9.5979	9.4015
13	11.9038	11.7241	11.5358	11.3407	11.1379	10.9283	10.7175	10.5050	10.2910	10.0773
14	12.7150	12.5186	12.3128	12.1002	11.8801	11.6552	11.4282	11.1981	10.9668	10.7353
15	13.5096	13.2956	13.0723	12.8424	12.6070	12.3659	12.1213	11.8739	11.6248	11.3767
16	14.2866	14.0551	13.8146	13.5693	13.3177	13.0590	12.7971	12.5319	12.2662	12.0009
17	15.0461	14.7974	14.5414	14.2800	14.0108	13.7348	13.4551	13.1733	12.8904	12.6065
18	15.7883	15.5242	15.2521	14.9731	14.6866	14.3928	14.0965	13.7975	13.4960	13.1938
19	16.5151	16.2349	15.9452	15.6489	15.3447	15.0342	14.7207	14.4031	14.0833	13.7641
20	17.2259	16.9280	16.6210	16.3069	15.9860	15.6584	15.3263	14.9904	14.6536	14.3177
21	17.9190	17.6038	17.2791	16.9483	16.6102	16.2640	15.9136	15.5607	15.2072	14.8545
22	18.5948	18.2619	17.9204	17.5725	17.2158	16.8513	16.4839	16.1143	15.7440	15.3744
23	19.2528	18.9032	18.5447	18.1781	17.8032	17.4216	17.0375	16.6511	16.2639	15.8785
24	19.8942	19.5275	19.1502	18.7654	18.3734	17.9752	17.5743	17.1710	16.7680	16.3672
25	20.5184	20.1330	19.7376	19.3357	18.9270	18.5120	18.0942	17.6751	17.2567	16.8404
30	23.3720	22.9010	22.4223	21.9388	21.4497	20.9562	20.4623	19.9688	19.4778	18.9913
35	25.8162	25.2690	24.7159	24.1600	23.6006	23.0391	22.4793	21.9220	21.3693	20.8230
40	27.8991	27.2860	26.6692	26.0514	25.4323	24.8128	24.1969	23.5853	22.9800	22.3828
45	29.6728	29.0037	28.3325	27.6621	26.921	26.3233	25.6596	25.0018	24.3517	23.7111
50	31.1833	30.4664	29.7489	29.0338	28.3204	27.6096	26.9052	26.2080	25.5198	24.8422

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-NG-4. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9490	0.9036	0.8741	0.8545	0.8474	0.8642	0.8925	0.9253	0.9480	0.9538
2	1.8527	1.7778	1.7286	1.7019	1.7116	1.7568	1.8178	1.8733	1.9018	1.9012
3	2.7268	2.6323	2.5761	2.5662	2.6042	2.6821	2.7659	2.8271	2.8492	2.8464
4	3.5813	3.4797	3.4403	3.4587	3.5295	3.6301	3.7197	3.7745	3.7944	3.7627
5	4.4287	4.3439	4.3328	4.3840	4.4775	4.5839	4.6670	4.7197	4.7108	4.6322
6	5.2930	5.2365	5.2581	5.3320	5.4313	5.5313	5.6123	5.6360	5.5802	5.4702
7	6.1855	6.1618	6.2062	6.2858	6.3787	6.4765	6.5286	6.5055	6.4183	6.2807
8	7.1108	7.1098	7.1600	7.2332	7.3239	7.3928	7.3981	7.3436	7.2288	7.0646
9	8.0588	8.0636	8.1073	8.1784	8.2402	8.2623	8.2361	8.1541	8.0126	7.8226
10	9.0126	9.0110	9.0525	9.0947	9.1097	9.1004	9.0466	8.9379	8.7706	8.5556
11	9.9600	9.9562	9.9689	9.9642	9.9478	9.9109	9.8305	9.6959	9.5036	9.2651
12	10.9052	10.8725	10.8383	10.8023	10.7583	10.6947	10.5885	10.4289	10.2131	9.9519
13	11.8216	11.7420	11.6764	11.6128	11.5421	11.4527	11.3214	11.1384	10.8999	10.6166
14	12.6910	12.5801	12.4869	12.3966	12.3001	12.1857	12.0310	11.8252	11.5647	11.2600
15	13.5291	13.3906	13.2707	13.1546	13.0331	12.8952	12.7178	12.4900	12.2081	11.8827
16	14.3396	14.1744	14.0287	13.8876	13.7426	13.5820	13.3825	13.1333	12.8307	12.4859
17	15.1234	14.9324	14.7617	14.5971	14.4294	14.2468	14.0259	13.7560	13.4339	13.0702
18	15.8814	15.6654	15.4713	15.2839	15.0942	14.8901	14.6486	14.3592	14.0182	13.6356
19	16.6144	16.3749	16.1581	15.9487	15.7375	15.5128	15.2518	14.9435	14.5836	14.1826
20	17.3239	17.0617	16.8228	16.5921	16.3602	16.1160	15.8361	15.5089	15.1307	14.7125
21	18.0107	17.7265	17.4662	17.2147	16.9634	16.7003	16.4015	16.0560	15.6605	15.2256
22	18.6755	18.3698	18.0888	17.8179	17.5477	17.2657	16.9485	16.5858	16.1736	15.7224
23	19.3189	18.9925	18.6920	18.4022	18.1131	17.8127	17.4783	17.0989	16.6705	16.2036
24	19.9415	19.5957	19.2764	18.9676	18.6602	18.3426	17.9914	17.5958	17.1516	16.6699
25	20.5447	20.1800	19.8417	19.5147	19.1900	18.8557	18.4883	18.0769	17.6179	17.1218
30	23.2844	22.8323	22.4097	22.0019	21.5993	21.1899	20.7501	20.2689	19.7423	19.1806
35	25.6186	25.0941	24.6018	24.1263	23.6582	23.1852	22.6838	22.1430	21.5585	20.9408
40	27.6139	27.0278	26.4758	25.9425	25.4183	24.8910	24.3370	23.7451	23.1112	22.4455
45	29.3197	28.6809	28.0779	27.4952	26.9231	26.3493	25.7503	25.1148	24.4386	23.7320
50	30.7781	30.0943	29.4476	28.8226	28.2095	27.5961	26.9586	26.2858	25.5735	24.8318

Notes : <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-SC-4. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9752	0.9368	0.8892	0.8541	0.8280	0.8026	0.7733	0.7473	0.7200	0.6937
2	1.9121	1.8260	1.7433	1.6821	1.6306	1.5759	1.5206	1.4672	1.4136	1.3620
3	2.8012	2.6801	2.5712	2.4847	2.4038	2.3232	2.2405	2.1609	2.0819	2.0339
4	3.6553	3.5081	3.3738	3.2580	3.1511	3.0431	2.9342	2.8292	2.7239	2.6279
5	4.4833	4.3107	4.1471	4.0052	3.8711	3.7368	3.6025	3.4712	3.3478	3.2394
6	5.2859	5.0840	4.8944	4.7252	4.5647	4.4051	4.2445	4.0951	3.9594	3.8336
7	6.0592	5.8312	5.6144	5.4189	5.2330	5.0471	4.8684	4.7067	4.5536	4.4076
8	6.8065	6.5512	6.3080	6.0872	5.8750	5.6710	5.4799	5.3008	5.1276	4.9621
9	7.5264	7.2449	6.9763	6.7292	6.4989	6.2825	6.0741	5.8748	5.6820	5.4977
10	8.2201	7.9132	7.6183	7.3531	7.1105	6.8767	6.6481	6.4293	6.2176	6.0150
11	8.8884	8.5551	8.2422	7.9646	7.7047	7.4507	7.2026	6.9649	6.7350	6.5148
12	9.5304	9.1791	8.8538	8.5588	8.2787	8.0052	7.7382	7.4823	7.2347	6.9974
13	10.1543	9.7906	9.4480	9.1328	8.8332	8.5408	8.2556	7.9820	7.7174	7.4636
14	10.7658	10.3848	10.0220	9.6873	9.3688	9.0582	8.7553	8.4647	8.1836	7.9139
15	11.3600	10.9588	10.5764	10.2229	9.8861	9.5579	9.2380	8.9309	8.6339	8.3487
16	11.9340	11.5133	11.1120	10.7403	10.3859	10.0406	9.7042	9.3811	9.0687	8.7687
17	12.4885	12.0489	11.6294	11.2400	10.8685	10.5068	10.1544	9.8160	9.4887	9.1743
18	13.0241	12.5662	12.1291	11.7227	11.3347	10.9570	10.5893	10.2359	9.8943	9.5660
19	13.5415	13.0660	12.6118	12.1888	11.7850	11.3919	11.0092	10.6415	10.2859	9.9452
20	14.0412	13.5486	13.0780	12.6391	12.2198	11.8118	11.4148	11.0332	10.6651	10.3123
21	14.5239	14.0148	13.5283	13.0740	12.6398	12.2174	11.8065	11.4124	11.0323	10.6668
22	14.9901	14.4651	13.9631	13.4939	13.0454	12.6091	12.1857	11.796	11.3868	11.0092
23	15.4403	14.8999	14.3831	13.8995	13.4370	12.9883	12.5529	12.1341	11.7291	11.3397
24	15.8752	15.3199	14.7887	14.2912	13.8163	13.3554	12.9074	12.4764	12.0597	11.6588
25	16.2951	15.7255	15.1803	14.6704	14.1834	13.7100	13.2497	12.8069	12.3788	11.9669
30	18.1933	17.5604	16.9541	16.3840	15.8380	15.3076	14.7922	14.2962	13.8167	13.3553
35	19.7909	19.1029	18.4434	17.8220	17.2264	16.6480	16.0864	15.5458	15.0232	14.5201
40	21.1313	20.3971	19.6929	19.0284	18.3912	17.7726	17.1722	16.5942	16.0354	15.4974
45	22.2560	21.4829	20.7413	20.0406	19.3685	18.7162	18.0833	17.4738	16.8847	16.3174
50	23.1995	22.3940	21.6209	20.8899	20.1885	19.5079	18.8477	18.2118	17.5972	17.0053

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).
 <3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

ENERGY STUDIES: REGION 4

ENERGY STUDIES: REGION 4

Table E-3-LP-4. Present Worth Factors--Liquified Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9788	0.9628	0.9443	0.9203	0.8965	0.8642	0.8358	0.8203	0.8078	0.7921
2	1.9416	1.9071	1.8646	1.8168	1.7606	1.6999	1.6561	1.6281	1.5999	1.5637
3	2.8859	2.8275	2.7611	2.6810	2.5964	2.5203	2.4639	2.4202	2.3714	2.3162
4	3.8062	3.7239	3.6252	3.5168	3.4167	3.3280	3.2560	3.1918	3.1240	3.0456
5	4.7027	4.5881	4.4610	4.3371	4.2245	4.1201	4.0275	3.9443	3.8533	3.7585
6	5.5668	5.4239	5.2814	5.1448	5.0166	4.8917	4.7801	4.6737	4.5663	4.4571
7	6.4026	6.2442	6.0891	5.9370	5.7882	5.6442	5.5094	5.3866	5.2649	5.1318
8	7.2230	7.0520	6.8812	6.7085	6.5407	6.3736	6.2224	6.0852	5.9395	5.7832
9	8.0307	7.8441	7.6528	7.4611	7.2701	7.0865	6.9210	6.7599	6.5909	6.4121
10	8.8228	8.6156	8.4053	8.1904	7.9830	7.7852	7.5956	7.4112	7.2199	7.0198
11	9.5944	9.3682	9.1347	8.9033	8.6817	8.4598	8.2470	8.0402	7.8275	7.6067
12	10.3469	10.0975	9.8476	9.6020	9.3563	9.1112	8.8760	8.6479	8.4145	8.1730
13	11.0763	10.8104	10.5463	10.2766	10.0077	9.7401	9.4837	9.2348	8.9807	8.7195
14	11.7892	11.5091	11.2209	10.9280	10.6366	10.3478	10.0706	9.8011	9.5272	9.2469
15	12.4879	12.1837	11.8723	11.5569	11.2443	10.9348	10.6369	10.3476	10.0546	9.7559
16	13.1625	12.8351	12.5012	12.1646	11.8312	11.5010	11.1834	10.8750	10.5636	10.2467
17	13.8139	13.4641	13.1089	12.7516	12.3975	12.0475	11.7108	11.3840	11.0545	10.7197
18	14.4428	14.0717	13.6958	13.3178	12.9440	12.5749	12.2197	11.8748	11.5275	11.1757
19	15.0505	14.6587	14.2621	13.8643	13.4714	13.0839	12.7106	12.3478	11.9834	11.6152
20	15.6374	15.2249	14.8086	14.3917	13.9804	13.5747	13.1836	12.8038	12.4230	12.0389
21	16.2037	15.7714	15.3360	14.9007	14.4712	14.0477	13.6395	13.2433	12.8467	12.4472
22	16.7502	16.2988	15.8450	15.3916	14.9442	14.5037	14.0791	13.6670	13.2550	12.8405
23	17.2776	16.8078	16.3358	15.8646	15.4002	14.9432	14.5028	14.0753	13.6483	13.2194
24	17.7866	17.2987	16.8088	16.3205	15.8397	15.3670	14.9111	14.4686	14.0271	13.5844
25	18.2774	17.7717	17.2648	16.7601	16.2634	15.7752	15.3044	14.8475	14.3922	13.9362
30	20.4779	19.8925	19.3085	18.7293	18.1607	17.6032	17.0657	16.5446	16.0275	15.5120
35	22.3059	21.6537	21.0056	20.3646	19.7365	19.1216	18.5288	17.9545	17.3861	16.8211
40	23.8243	23.1169	22.4155	21.7232	21.0456	20.3830	19.7443	19.1257	18.5146	17.9085
45	25.0857	24.3323	23.5867	22.8517	22.1330	21.4309	20.7540	20.0986	19.4521	18.8119
50	26.1335	25.3420	24.5596	23.7892	23.0364	22.3013	21.5927	20.9068	20.2309	19.5623

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.
Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design.Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1995).
<3> Region 4: MT, ID, WY, CO, NM, AZ, UT, NV, WA, OR, CA, AK, HI

Table E-3-EL-5. Present Worth Factors--Electricity

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9579	0.9215	0.8889	0.8578	0.8283	0.8012	0.7755	0.7498	0.7227	0.6964
2	1.8794	1.8104	1.7467	1.6862	1.6296	1.5768	1.5253	1.4726	1.4191	1.3685
3	2.7683	2.6682	2.5751	2.4874	2.4051	2.3266	2.2481	2.1690	2.0913	2.0183
4	3.6262	3.4966	3.3763	3.2629	3.1549	3.0493	2.9445	2.8411	2.7411	2.6473
5	4.4545	4.2978	4.1519	4.0127	3.8777	3.7457	3.6166	3.4909	3.3700	3.2557
6	5.2557	5.0733	4.9017	4.7355	4.5741	4.4179	4.2664	4.1199	3.9785	3.8413
7	6.0313	5.8232	5.6244	5.4319	5.2462	5.0676	4.8954	4.7283	4.5641	4.4035
8	6.7811	6.5459	6.3208	6.1040	5.8960	5.6966	5.5038	5.3139	5.1263	4.9432
9	7.5038	7.2423	6.9930	6.7538	6.5250	6.3051	6.0894	5.8761	5.6660	5.4613
10	8.2002	7.9144	7.6427	7.3828	7.1334	6.8907	6.6516	6.4158	6.1840	5.9587
11	8.8724	8.5642	8.2717	7.9912	7.7190	7.4529	7.1913	6.9339	6.6814	6.4361
12	9.5221	9.1932	8.8801	8.5768	8.2812	7.9925	7.7094	7.4312	7.1589	6.8945
13	10.1511	9.8016	9.4658	9.1390	8.8209	8.5106	8.2067	7.9087	7.6172	7.3346
14	10.7596	10.3872	10.0279	9.6787	9.3390	9.0080	8.6842	8.3670	8.0573	7.7573
15	11.3452	10.9494	10.5676	10.1968	9.8363	9.4854	9.1425	8.8072	8.4800	8.1630
16	11.9074	11.4891	11.0857	10.6941	10.3138	9.9438	9.5827	9.2298	8.8858	8.5526
17	12.4470	12.0072	11.5831	11.1716	10.7721	10.3839	10.0054	9.6356	9.2753	8.9265
18	12.9651	12.5046	12.0605	11.6299	11.2123	10.8066	10.4111	10.0251	9.6492	9.2855
19	13.4625	12.9820	12.5189	12.0701	11.6350	11.2124	10.8006	10.3991	10.0082	9.6301
20	13.9399	13.4404	12.9590	12.4928	12.0407	11.6019	11.1746	10.7580	10.3528	9.9609
21	14.3983	13.8805	13.3817	12.8985	12.4302	11.9758	11.5335	11.1026	10.6836	10.2785
22	14.8384	14.3032	13.7875	13.2880	12.8042	12.3348	11.8781	11.4334	11.0013	10.5836
23	15.2611	14.7089	14.1770	13.6620	13.1631	12.6794	12.2090	11.7511	11.3063	10.8765
24	15.6669	15.0985	14.5509	14.0209	13.5077	13.0102	12.5266	12.0562	11.5992	11.1576
25	16.0564	15.4724	14.9099	14.3655	13.8385	13.3279	12.8317	12.3490	11.8803	11.4275
30	17.7824	17.1295	16.5009	15.8931	15.3051	14.7359	14.1833	13.6466	13.1259	12.6232
35	19.1904	18.4812	17.7984	17.1387	16.5009	15.8838	15.2853	14.7044	14.1415	13.5981
40	20.3383	19.5831	18.8563	18.1542	17.4758	16.8196	16.1837	15.5669	14.9694	14.3929
45	21.2741	20.4815	19.7187	18.9821	18.2706	17.5826	16.9162	16.2700	15.6444	15.0409
50	22.0371	21.2140	20.4219	19.6571	18.9186	18.2047	17.5133	16.8433	16.1947	15.5692

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
 of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
 Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes
 for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

Table E-3-DO-5. Present Worth Factors--Distillate Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0148	1.0224	1.0106	0.9926	0.9719	0.9487	0.9275	0.9080	0.8908	0.8721
2	2.0372	2.0330	2.0032	1.9645	1.9206	1.8762	1.8354	1.7987	1.7629	1.7216
3	3.0478	3.0256	2.9751	2.9132	2.8481	2.7841	2.7262	2.6709	2.6124	2.5488
4	4.0404	3.9975	3.9238	3.8407	3.7560	3.6749	3.5983	3.5203	3.4396	3.3555
5	5.0123	4.9462	4.8513	4.7486	4.6468	4.5470	4.4478	4.3475	4.2462	4.1431
6	5.9610	5.8737	5.7592	5.6394	5.5189	5.3965	5.2750	5.1542	5.0339	4.9103
7	6.8885	6.7817	6.6500	6.5115	6.3684	6.2237	6.0816	5.9418	5.8011	5.6551
8	7.7964	7.6724	7.5222	7.3610	7.1956	7.0304	6.8693	6.7090	6.5459	6.3781
9	8.6872	8.5446	8.3716	8.1882	8.0222	7.8180	7.6365	7.4538	7.2689	7.0799
10	9.5593	9.3940	9.1988	8.9949	8.7899	8.5852	8.3813	8.1768	7.9707	7.7620
11	10.4088	10.2212	10.0055	9.7825	9.5571	9.3300	9.1043	8.8786	8.6528	8.4245
12	11.2360	11.0279	10.7931	10.5497	10.3019	10.0530	9.8061	9.5607	9.3152	9.0663
13	12.0427	11.8155	11.5603	11.2945	11.0249	10.7548	10.4882	10.2232	9.9571	9.6882
14	12.8303	12.5827	12.3051	12.0175	11.7267	11.4369	11.1506	10.8650	10.5789	10.2910
15	13.5975	13.3275	13.0281	12.7193	12.4088	12.0993	11.7925	11.4869	11.1818	10.8754
16	14.3423	14.0505	13.7299	13.4014	13.0712	12.7412	12.4143	12.0897	11.7662	11.4411
17	15.0653	14.7523	14.4120	14.0639	13.7131	13.3630	13.0172	12.6742	12.3319	11.9883
18	15.7671	15.4344	15.0745	14.7057	14.3349	13.9659	13.6016	13.2399	12.8791	12.5176
19	16.4492	16.0969	15.7163	15.3276	14.9378	14.5503	14.1673	13.7870	13.4083	13.0294
20	17.1117	16.7387	16.3382	15.9304	15.5222	15.1160	14.7145	14.3163	13.9202	13.5244
21	17.7535	17.3606	16.9410	16.5148	16.0879	15.6632	15.2437	14.8281	14.4152	14.0029
22	18.3754	17.9634	17.5255	17.0806	16.6351	16.1924	15.7556	15.3232	14.8936	14.4649
23	18.9782	18.5479	18.0912	17.6277	17.1643	16.7043	16.2506	15.8016	15.3556	14.9111
24	19.5626	19.1136	18.6383	18.1570	17.6762	17.1993	16.7290	16.2636	15.8018	15.3420
25	20.1284	19.6607	19.1676	18.6688	18.1712	17.6777	17.1911	16.7098	16.2327	15.7583
30	22.6901	22.1373	21.5611	20.9814	20.4051	19.8355	19.2756	18.7238	18.1789	17.6389
35	24.8479	24.2218	23.5751	22.9275	22.2857	21.6527	21.0315	20.4206	19.8185	19.2232
40	26.6650	25.9778	25.2719	24.5671	23.8700	23.1837	22.5109	21.8501	21.1998	20.5580
45	28.1960	27.4572	26.7014	25.9484	25.2048	24.4735	23.7573	23.0544	22.3636	21.6826
50	29.4858	28.7035	27.9057	27.1122	26.3293	25.5601	24.8073	24.0691	23.3440	22.6300

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

Table E-3-RO-5. Present Worth Factors--Residual Oil

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9926	0.9843	0.9751	0.9651	0.9559	0.9460	0.9325	0.9171	0.9014	0.8856
2	1.9769	1.9594	1.9402	1.9210	1.9019	1.8785	1.8496	1.8185	1.7871	1.7553
3	2.9520	2.9245	2.8961	2.8670	2.8344	2.7956	2.7510	2.7042	2.6567	2.6101
4	3.9171	3.8804	3.8421	3.7995	3.7515	3.6970	3.6366	3.5738	3.5115	3.4509
5	4.8730	4.8264	4.7746	4.7166	4.6529	4.5827	4.5063	4.4286	4.3524	4.2788
6	5.8190	5.7589	5.6917	5.6180	5.5386	5.4523	5.3611	5.2695	5.1802	5.0913
7	6.7515	6.6760	6.5931	6.5037	6.4082	6.3071	6.2019	6.0973	5.9927	5.8861
8	7.6686	7.5774	7.4787	7.3733	7.2630	7.1480	7.0298	6.9098	6.7876	6.6636
9	8.5700	8.4631	8.3484	8.2281	8.1039	7.9758	7.8423	7.7047	7.5650	7.4237
10	9.4557	9.3327	9.2032	9.0690	8.9317	8.7883	8.6371	8.4821	8.3252	8.1686
11	10.3253	10.1875	10.0440	9.8968	9.7442	9.5832	9.4146	9.2423	9.0700	8.8972
12	11.1801	11.0284	10.8719	10.7093	10.5391	10.3606	10.1747	9.9871	9.7987	9.6073
13	12.0210	11.8562	11.6844	11.5042	11.3165	11.1208	10.9196	10.7158	10.5088	10.3000
14	12.8488	12.6687	12.4793	12.2816	12.0767	11.8656	11.6482	11.4259	11.2014	10.9755
15	13.6613	13.4636	13.2567	13.0418	12.8215	12.5943	12.3583	12.1185	11.8769	11.6341
16	14.4562	14.2410	14.0169	13.7866	13.5502	13.3044	13.0510	12.7940	12.5356	12.2747
17	15.2336	15.0012	14.7617	14.5153	14.2603	13.9970	13.7265	13.4526	13.1761	12.8963
18	15.9938	15.7460	15.4904	15.2254	14.9529	14.6725	14.3851	14.0932	13.7977	13.5000
19	16.7386	16.4747	16.2005	15.9180	15.6284	15.3312	15.0257	14.7148	14.4014	14.0863
20	17.4673	17.1848	16.8931	16.5935	16.2871	15.9717	15.6473	15.3185	14.9877	14.6556
21	18.1774	17.8774	17.5686	17.2521	16.9276	16.5933	16.2510	15.9048	15.5570	15.2078
22	18.8700	18.5529	18.2272	17.8927	17.5492	17.1970	16.8373	16.4741	16.1092	15.7427
23	19.5455	19.2115	18.8678	18.5143	18.1529	17.7833	17.4066	17.0263	16.6442	16.2609
24	20.2041	19.8521	19.4894	19.1180	18.7392	18.3526	17.9588	17.5612	17.1624	16.7634
25	20.8447	20.4737	20.0931	19.7043	19.3085	18.9048	18.4937	18.0795	17.6649	17.2506
30	23.7778	23.3201	22.8540	22.3815	21.9036	21.4201	20.9320	20.4436	19.9571	19.4732
35	26.2931	25.7585	25.2182	24.6737	24.1261	23.5750	23.0214	22.4694	21.9213	21.3776
40	28.4480	27.8478	27.2440	26.6379	26.0305	25.4215	24.8117	24.2053	23.6043	23.0094
45	30.2945	29.6381	28.9799	28.3209	27.6624	27.0037	26.3458	25.6927	25.0465	24.4077
50	31.8766	31.1722	30.4673	29.7631	29.0606	28.3594	27.6603	26.9672	26.2822	25.6058

Notes: <1> Data Based on Assumed DOS of Apr 1996.
 Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.
 Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

ENERGY STUDIES : U.S. AVERAGE

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Table E-3-NG-5. Present Worth Factors--Natural Gas

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9554	0.9297	0.9206	0.9191	0.9203	0.9292	0.9410	0.9511	0.9546	0.9531
2	1.8850	1.8502	1.8397	1.8394	1.8495	1.8702	1.8922	1.9058	1.9077	1.8911
3	2.8056	2.7694	2.7600	2.7686	2.7906	2.8214	2.8468	2.8588	2.8458	2.8117
4	3.7247	3.6897	3.6892	3.7097	3.7417	3.7760	3.7999	3.7969	3.7663	3.7123
5	4.6450	4.6189	4.6302	4.6608	4.6963	4.7291	4.7379	4.7174	4.6670	4.5881
6	5.5742	5.5599	5.5814	5.6154	5.6494	5.6672	5.6585	5.6181	5.5427	5.4354
7	6.5153	6.5110	6.5360	6.5685	6.5875	6.5877	6.5591	6.4939	6.3900	6.2552
8	7.4664	7.4657	7.4891	7.5066	7.5080	7.4884	7.4349	7.3412	7.2098	7.0482
9	8.4210	8.4187	8.4271	8.4271	8.4087	8.3641	8.2822	8.1609	8.0029	7.8154
10	9.3741	9.3568	9.3476	9.3278	9.2844	9.2114	9.1020	8.9540	8.7701	8.5585
11	10.3122	10.2773	10.2483	10.2035	10.1317	10.0312	9.8951	9.7212	9.5131	9.2780
12	11.2327	11.1780	11.1241	11.0508	10.9515	10.8243	10.6623	10.4642	10.2326	9.9747
13	12.1334	12.0538	11.9714	11.8706	11.7446	11.5915	11.4053	11.1838	10.9294	10.6494
14	13.0091	12.9011	12.7912	12.6637	12.5118	12.3345	12.1248	11.8805	11.6040	11.3026
15	13.8564	13.7209	13.5842	13.4309	13.2548	13.0540	12.8215	12.5551	12.2572	11.9350
16	14.6762	14.5139	14.3514	14.1739	13.9743	13.7507	13.4962	13.2083	12.8896	12.5472
17	15.4693	15.2811	15.0945	14.8934	14.6711	14.4254	14.1494	13.8407	13.5018	13.1405
18	16.2365	16.0241	15.8140	15.5902	15.3457	15.0786	14.7818	14.4529	14.0951	13.7154
19	16.9795	16.7437	16.5107	16.2648	15.9989	15.7110	15.3940	15.0462	14.6700	14.2719
20	17.6990	17.4404	17.1854	16.9180	16.6313	16.3232	15.9873	15.6212	15.2265	14.8104
21	18.3958	18.1151	17.8386	17.5504	17.2435	16.9165	16.5622	16.1776	15.7651	15.3322
22	19.0704	18.7682	18.4710	18.1626	17.8368	17.4914	17.1187	16.7162	16.2869	15.8377
23	19.7236	19.4006	19.0832	18.7559	18.4117	18.0479	17.6572	17.2380	16.7923	16.3279
24	20.3560	20.0129	19.6765	19.3308	18.9682	18.5864	18.1790	17.7435	17.2825	16.8031
25	20.9682	20.6062	20.2514	19.8873	19.5068	19.1082	18.6845	18.2336	17.7578	17.2635
30	23.7533	23.3034	22.8639	22.4186	21.9598	21.4853	20.9879	20.4651	19.9190	19.3567
35	26.1303	25.6068	25.0953	24.5798	24.0530	23.5127	22.9515	22.3669	21.7610	21.1407
40	28.1577	27.5704	26.9972	26.4218	25.8371	25.2406	24.6251	23.9878	23.3309	22.6612
45	29.8856	29.2439	28.6180	27.9917	27.3576	26.7133	26.0514	25.3693	24.6689	23.5571
50	31.3583	30.6703	29.9995	29.3297	28.6535	27.9684	27.2670	26.5466	25.8092	25.0616

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

ENERGY STUDIES: U.S. AVERAGE

ENERGY STUDIES: U.S. AVERAGE

Table E-3-SC-5. Present Worth Factors--Steam Coal

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9673	0.9292	0.8926	0.8574	0.8236	0.7966	0.7679	0.7376	0.7110	0.6853
2	1.8964	1.8217	1.7500	1.6811	1.6203	1.5645	1.5055	1.4486	1.3963	1.3459
3	2.7890	2.6792	2.5736	2.4777	2.3882	2.3022	2.2165	2.1340	2.0569	1.9847
4	3.6464	3.5028	3.3703	3.2456	3.1258	3.0132	2.9018	2.7945	2.6957	2.6024
5	4.4701	4.2994	4.1382	3.9832	3.8368	3.6985	3.5624	3.4333	3.3134	3.2017
6	5.2667	5.0673	4.8758	4.6942	4.5221	4.3590	4.2012	4.0510	3.9127	3.7831
7	6.0346	5.8050	5.5868	5.3796	5.1827	4.9978	4.8189	4.6504	4.4941	4.3453
8	6.7722	6.5160	6.2721	6.0401	5.8215	5.6156	5.4182	5.2318	5.0563	4.8870
9	7.4832	7.2013	6.9327	6.6789	6.4392	6.2149	5.9997	5.7939	5.5980	5.4091
10	8.1686	7.8618	7.5715	7.2966	7.0385	6.7963	6.5618	6.3357	6.1201	5.9139
11	8.8291	8.5006	8.1892	7.8960	7.6199	7.3584	7.1036	6.8578	6.6249	6.4003
12	9.4679	9.1184	8.7885	8.4774	8.1821	7.9002	7.6257	7.3625	7.1113	6.8691
13	10.0856	9.7177	9.3699	9.0395	8.7239	8.4223	8.1304	7.8490	7.5801	7.3222
14	10.6850	10.2991	9.9321	9.5813	9.2459	8.9271	8.6168	8.3177	8.0332	7.7589
15	11.2664	10.8613	10.4738	10.1034	9.7507	9.4135	9.0856	8.7709	8.4699	8.1797
16	11.8285	11.4030	10.9959	10.6081	10.2371	9.8822	9.5388	9.2075	8.8907	8.5865
17	12.3703	11.9251	11.5007	11.0946	10.7059	10.3354	9.9754	9.6283	9.2975	8.9784
18	12.8924	12.4299	11.9871	11.5633	11.1590	10.7721	10.3962	10.0351	9.6894	9.3561
19	13.3971	12.9163	12.4559	12.0165	11.5957	11.1929	10.8030	10.4271	10.0671	9.7212
20	13.8836	13.3850	12.9090	12.4531	12.0165	11.5996	11.1950	10.8048	10.4322	10.0729
21	14.3523	13.8382	13.3457	12.8739	12.4233	11.9916	11.5726	11.1698	10.7839	10.4119
22	14.8055	14.2749	13.7665	13.2807	12.8152	12.3693	11.9377	11.5216	11.1229	10.7395
23	15.2421	14.6957	14.1733	13.6727	13.1929	12.7344	12.2895	11.8605	11.4505	11.0561
24	15.6629	15.1024	14.5652	14.0504	13.5580	13.0861	12.6284	12.1881	11.7671	11.3611
25	16.0697	15.4944	14.9429	14.4154	13.9098	13.4251	12.9560	12.5047	12.0721	11.6550
30	17.8951	17.2555	16.6429	16.0554	15.4919	14.9514	14.4276	13.9226	13.4383	12.9713
35	19.4215	18.7271	18.0608	17.4215	16.8082	16.2197	15.6496	15.1000	14.5727	14.0643
40	20.6897	19.9490	19.2382	18.5559	17.9011	17.2728	16.6642	16.0776	15.5146	14.9719
45	21.7428	20.9637	20.2158	19.4979	18.8087	18.1472	17.5068	16.8894	16.2968	15.7255
50	22.6173	21.8062	21.0276	20.2800	19.5624	18.8733	18.2064	17.5635	16.9463	16.3513

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design.

Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Industrial Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

ENERGY STUDIES: U.S. AVERAGE

ENERGY STUDIES: U.S. AVERAGE

Table E-3-LP-5. Present Worth Factors--Liquified Petroleum Gas (LPG)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9875	0.9735	0.9527	0.9273	0.9039	0.8809	0.8569	0.8318	0.8074	0.7866
2	1.9610	1.9263	1.8800	1.8312	1.7848	1.7378	1.6888	1.6392	1.5940	1.5522
3	2.9137	2.8536	2.7839	2.7121	2.6417	2.5697	2.4961	2.4258	2.3596	2.2945
4	3.8410	3.7575	3.6648	3.5690	3.4736	3.3770	3.2827	3.1914	3.1019	3.0141
5	4.7449	4.6384	4.5218	4.4009	4.2809	4.1636	4.0484	3.9337	3.8215	3.7160
6	5.6258	5.4953	5.3536	5.2082	5.0675	4.9293	4.7907	4.6533	4.5234	4.3991
7	6.4828	6.3271	6.1610	5.9948	5.8332	5.6716	5.5102	5.3552	5.2065	5.0586
8	7.3146	7.1345	6.9476	6.7605	6.5755	6.3912	6.2122	6.0383	5.8660	5.6955
9	8.1220	7.9211	7.7132	7.5028	7.2950	7.0931	6.8952	6.6978	6.5028	6.3101
10	8.9086	8.6868	8.4555	8.2223	7.9970	7.7761	7.5548	7.3347	7.1175	6.9039
11	9.6742	9.4290	9.1751	8.9243	8.6800	8.4357	8.1916	7.9493	7.7113	7.4777
12	10.4165	10.1486	9.8770	9.6073	9.3396	9.0725	8.8062	8.5431	8.2850	8.0312
13	11.1361	10.8505	10.5601	10.2669	9.9764	9.6871	9.4001	9.1169	8.8385	8.5651
14	11.8380	11.5336	11.2196	10.9037	10.5910	10.2810	9.9738	9.6704	9.3725	9.0804
15	12.5211	12.1932	11.8564	11.5183	11.1849	10.8547	10.5273	10.2043	9.8878	9.5777
16	13.1806	12.8300	12.4710	12.1122	11.7586	11.4082	11.0613	10.7196	10.3851	10.0573
17	13.8174	13.4446	13.0649	12.6859	12.3121	11.9422	11.5766	11.2169	10.8646	10.5195
18	14.4321	14.0384	13.6386	13.2394	12.8461	12.4575	12.0738	11.6965	11.3269	10.9651
19	15.0259	14.6122	14.1921	13.7734	13.3614	12.9548	12.5534	12.1587	11.7725	11.3945
20	15.5996	15.1657	14.7261	14.2887	13.8586	13.4343	13.0157	12.6043	12.2019	11.8083
21	16.1531	15.6996	15.2414	14.7859	14.3382	13.8966	13.4613	13.0337	12.6157	12.2072
22	16.6871	16.2149	15.7387	15.2655	14.8005	14.3422	13.8907	13.4475	13.0145	12.5915
23	17.2024	16.7122	16.2182	15.7278	15.2461	14.7716	14.3044	13.8464	13.3989	12.9617
24	17.6997	17.1918	16.6805	16.1734	15.6755	15.1854	14.7033	14.2307	13.7691	13.3183
25	18.1792	17.6540	17.1261	16.6028	16.0892	15.5842	15.0876	14.6009	14.1257	13.6618
30	20.3291	19.7260	19.1227	18.5265	17.9427	17.3697	16.8075	16.2575	15.7214	15.1988
35	22.1146	21.4458	20.7793	20.1223	19.4798	18.8502	18.2336	17.6312	17.0446	16.4734
40	23.5952	22.8720	22.1530	21.4455	20.7543	20.0779	19.4162	18.7703	18.1418	17.5303
45	24.8229	24.0545	23.2921	22.5427	21.8112	21.0960	20.3968	19.7149	19.0516	18.4067
50	25.8409	25.0352	24.2366	23.4525	22.6876	21.9401	21.2099	20.4981	19.8061	19.1334

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design. Data Based on Discount Rate of 4.1% and DOE Projections of Future Price Level Changes for Residential Sector (NIST Annual Supplement to Handbook 135, Oct 1995).

Part II. Tables of Present Worth Factors for Non-Energy Studies

Part II contains tables of present worth factors for use in computing the life-cycle costs of the competing alternatives in a non-energy study, where energy costs are either nonexistent or equal among all alternatives, in accordance with the provisions of governing DoD criteria (see Appendix A). The discount rates used to compute these present worth factors were taken from Appendix C of OMB Circular A-94 (January 1995). See the Preface of this report for the rationale for using a 4.6% discount rate for studies with short-term total study periods (10 years or less) and a 4.9% discount rate for studies with long-term total study periods (longer than 10 years).

Tables NE-1-1-ST, "Present Worth Factors--One-Time Costs, Zero Differential Escalation (Short Term Studies)" and NE-1-1-LT, "Present Worth Factors--One-Time Costs, Zero Differential Escalation (Long-Term Studies)" provide factors for costs which occur one time or at irregular time intervals throughout the study period and which increase at approximately the rate of general inflation (hence the term "zero differential escalation"). These costs may include construction/acquisition costs, non-annually recurring maintenance costs, major repair and replacement costs, and retention/salvage value or disposal cost. These factors are called "single present worth" (SPW) factors. The present worth of each cost occurrence is found by multiplying that cost, in Date-of-Study (DOS) prices, by the SPW factor corresponding to the time of occurrence (years after DOS). Interpolation is encouraged for non-integer time periods.

Table NE-1-1-ST should be used for short-term LCC studies, i.e., studies with a total study period of 10 years or less. This table is based on a 4.6% (real) discount rate. Table NE-1-1-LT should be used for long-term LCC studies, i.e., studies with a total study period longer than 10 years. This table is based on a 4.9% (real) discount rate. Note that the total length of the study period determines which table to use, not the time that a one-time cost is incurred. Thus, for a non-routine maintenance cost that occurs in the fifth year after the Beneficial Occupancy Date (BOD), in a LCC analysis with 30 years of beneficial occupancy (i.e., occupancy or usage), use the 5-year factor from table NE-1-1-LT (0.7986).

Tables NE-1-2-ST, "Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Short-Term Studies)" and NE-1-2-LT, "Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation (Long-Term Studies)" provide present worth factors for costs which occur one time or at irregular intervals throughout the study period and which change faster or more slowly than general price inflation. The "differential escalation rate" is the difference between the rate of increase in the particular type of cost under consideration and general price inflation.¹ Present worth factors are shown for differential escalation rates ranging from -5% to +5% in 1% increments. These factors are sometimes called "modified single present worth" (SPW*) factors. The present

¹ A more accurate way of calculating the differential escalation rate for a project-related cost is:

$$e = (1+E)/(1+I) - 1$$

where e = the differential escalation rate,
 E = the actual escalation rate, and
 I = the rate of general inflation.

worth of each cost occurrence is found by multiplying that cost, in DOS prices, by the SPW* factor corresponding to the time of occurrence (years after DOS) and the differential escalation rate. Interpolation is encouraged for time periods and escalation rates other than those shown on the table.

Table NE-1-2-ST should be used for short-term LCC studies, i.e., studies with a total study period of 10 years or less. This table is based on a 4.6% (real) discount rate. Table NE-1-2-LT should be used for long-term LCC studies, i.e., studies with a total study period longer than 10 years. This table is based on a 4.9% (real) discount rate. Note that the total length of the study period determines which table to use, not the time that a one-time cost is incurred. Thus, for a non-routine maintenance cost that is expected to occur in the fifth year after BOD and is expected to increase at an average annual rate of 2% above inflation, in a LCC analysis with a 30 year beneficial occupancy period, use the 5-year factor from table NE-1-2-LT (0.8692).

Table NE-2-1 provides present worth factors for costs which are incurred annually throughout the study period, such as routine maintenance and repair costs, and which are not expected to change faster or more slowly than the rate of general inflation. These factors are called "uniform present worth" (UPW) factors. The factors in this table are based on the assumption that the DOS is in April 1996, the BOD is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW factor. The number of payments generally corresponds to the number of years in the study period after BOD. Interpolation is encouraged for study periods and for BODs other than those shown on the tables.

Tables NE-2-2 through NE-2-11 provide present worth factors for costs which are incurred annually throughout the study period and which are expected to change faster or more slowly than the rate of general inflation. The differential rate of escalation is included in the table title; these differential rates range from -5% to +5% in 1% increments. Present worth factors which include escalation are sometimes called "modified uniform present worth" (UPW*) factors. The UPW* factors in this table are based on the assumption that the DOS is in April 1996, the BOD is in October of the same year or a future year, and that the annual cost occurs approximately at mid-year during each year of occupancy, or represents the sum of several costs distributed relatively uniformly throughout the year. The present worth of a cost recurring annually over the study period is found by multiplying the annual amount, in DOS prices, by the appropriate UPW* factor. The number of payments generally corresponds to the number of years in the study period after BOD. Interpolation is encouraged for study periods and escalation rates and BODs other than those shown on the tables.

As noted in the Preface, the tables for annually recurring costs (NE-2-1 through NE-2-11) are based on the assumption that the Date of Study is April of 1996, and that the BOD occurs in October of 1996 (or October of a subsequent year, through 2005). Therefore, for an LCC analysis covering a 10-year beneficial occupancy period beginning in October 1996, the total study period would be 10.5 years (April 1996 through October 2006). Accordingly, the present worth factor for beneficial occupancy periods of 10 years or longer are computed using the 4.9% discount rate for a long-term project.

NON-ENERGY STUDIES

Table NE-1-1-SR.

NON-ENERGY STUDIES
 Present Worth Factors - One-Time Costs - Study Period 1-10 Years
 Zero Differential Escalation Rate

Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000
0.25	0.9888
0.50	0.9778
0.75	0.9668
1	0.9560
2	0.9140
3	0.8738
4	0.8354
5	0.7986
6	0.7635
7	0.7299
8	0.6978
9	0.6671
10	0.6378

Notes:

<1> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design. (Discount Rate = 4.6%)

<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

NON-ENERGY STUDIES

NON-ENERGY STUDIES

Table NE-1-1-LT. Present Worth Factors - One-Time Costs - Study Period 11-50 Years
Zero Differential Escalation Rate

Time Cost Incurred (Years after DOS)	SPW Factor	Time Cost Incurred (Years after DOS)	SPW Factor
0.00	1.0000	16	0.4651
0.25	0.9881	17	0.4434
0.50	0.9764	18	0.4227
0.75	0.9648	19	0.4030
		20	0.3841
1	0.9533	21	0.3662
2	0.9088	22	0.3491
3	0.8663	23	0.3328
4	0.8258	24	0.3172
5	0.7873	25	0.3024
6	0.7505	26	0.2883
7	0.7154	27	0.2748
8	0.6820	28	0.2620
9	0.6502	29	0.2498
10	0.6198	30	0.2381
11	0.5908	35	0.1874
12	0.5632	40	0.1476
13	0.5369	45	0.1162
14	0.5119	50	0.0915
15	0.4879		

Notes:

<1> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design. (Discount Rate = 4.9%)

<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

NON-ENERGY STUDIES

NON-ENERGY STUDIES

Table NE-1-2-ST. Present Worth Factors--One-Time Costs - Study Period 1-10 Years
Non-Zero Differential Escalation

Time Cost Incurred (Years after DOS)	Differential Escalation Rate					
	-5%	-4%	-3%	-2%	-1%	1%
0.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.25	0.9762	0.9788	0.9813	0.9838	0.9863	0.9913
0.50	0.9530	0.9580	0.9630	0.9679	0.9729	0.9826
0.75	0.9303	0.9377	0.9450	0.9523	0.9596	0.9741
1	0.9082	0.9178	0.9273	0.9369	0.9465	0.9556
2	0.8249	0.8423	0.8600	0.8778	0.8958	0.9324
3	0.7492	0.7731	0.7975	0.8224	0.8478	0.9003
4	0.6804	0.7095	0.7395	0.7705	0.8024	0.8693
5	0.6180	0.6512	0.6858	0.7219	0.7595	0.8394
6	0.5612	0.5976	0.6360	0.6763	0.7188	0.8105
7	0.5097	0.5485	0.5898	0.6337	0.6803	0.7826
8	0.4630	0.5034	0.5469	0.5937	0.6439	0.7556
9	0.4205	0.4620	0.5072	0.5562	0.6094	0.7296
10	0.3819	0.4240	0.4703	0.5211	0.5768	0.7045

Notes: <1> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount Rate = 4.6%).

<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

NON-ENERGY STUDIES

NON-ENERGY STUDIES

Table NE-1-2-LT. Present Worth Factors--One-Time Costs, Non-Zero Differential Escalation Rates (Long-Term Studies)

Time Cost Incurred (Years after DOS)	Differential Escalation Rate								
	-5%	-4%	-3%	-2%	-1%	1%	2%	3%	4%
0.00	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.25	0.9755	0.9781	0.9806	0.9831	0.9856	0.9906	0.9930	0.9954	0.9978
0.50	0.9516	0.9566	0.9616	0.9666	0.9715	0.9812	0.9861	0.9909	0.9957
0.75	0.9283	0.9357	0.9430	0.9503	0.9575	0.9720	0.9792	0.9864	0.9936
1	0.9056	0.9152	0.9247	0.9342	0.9438	0.9628	0.9724	0.9819	0.9914
2	0.8202	0.8375	0.8551	0.8728	0.8907	0.9270	0.9455	0.9641	0.9829
3	0.7428	0.7665	0.7907	0.8154	0.8406	0.8926	0.9193	0.9466	0.9745
4	0.6727	0.7014	0.7311	0.7617	0.7933	0.8594	0.8939	0.9295	0.9661
5	0.6092	0.6419	0.6761	0.7116	0.7487	0.8274	0.8692	0.9127	0.9578
6	0.5517	0.5875	0.6251	0.6648	0.7066	0.7967	0.8452	0.8961	0.9496
7	0.4996	0.5376	0.5781	0.6211	0.6668	0.7670	0.8218	0.8799	0.9415
8	0.4525	0.4920	0.5345	0.5802	0.6293	0.7385	0.7991	0.8640	0.9334
9	0.4098	0.4503	0.4943	0.5421	0.5939	0.7111	0.7770	0.8483	0.9254
10	0.3711	0.4121	0.4570	0.5064	0.5605	0.6846	0.7555	0.8329	0.9174
11	0.3361	0.3771	0.4226	0.4731	0.5290	0.6592	0.7346	0.8179	0.9096
12	0.3044	0.3451	0.3908	0.4420	0.4992	0.6347	0.7143	0.8030	0.9018
13	0.2756	0.3158	0.3614	0.4129	0.4712	0.6111	0.6946	0.7885	0.8940
14	0.2496	0.2890	0.3342	0.3858	0.4447	0.5884	0.6754	0.7742	0.8864
15	0.2261	0.2645	0.3090	0.3604	0.4197	0.5665	0.6567	0.7602	0.8788
16	0.2047	0.2421	0.2857	0.3367	0.3961	0.5454	0.6386	0.7464	0.8712
17	0.1854	0.2215	0.2642	0.3145	0.3738	0.5251	0.6209	0.7329	0.8637
18	0.1679	0.2027	0.2443	0.2938	0.3528	0.5056	0.6037	0.7196	0.8563
19	0.1521	0.1855	0.2259	0.2745	0.3329	0.4868	0.5870	0.7066	0.8490
20	0.1377	0.1698	0.2089	0.2565	0.3142	0.4687	0.5708	0.6938	0.8417
21	0.1247	0.1554	0.1932	0.2396	0.2965	0.4513	0.5550	0.6812	0.8345
22	0.1129	0.1422	0.1786	0.2238	0.2798	0.4345	0.5397	0.6689	0.8273
23	0.1023	0.1301	0.1652	0.2091	0.2641	0.4184	0.5248	0.6568	0.8202
24	0.0926	0.1191	0.1527	0.1954	0.2492	0.4028	0.5103	0.6449	0.8132
25	0.0839	0.1090	0.1412	0.1825	0.2352	0.3878	0.4962	0.6332	0.8062
26	0.0760	0.0997	0.1306	0.1705	0.2220	0.3734	0.4824	0.6217	0.7993
27	0.0688	0.0913	0.1208	0.1593	0.2095	0.3595	0.4691	0.6105	0.7924
28	0.0623	0.0835	0.1117	0.1488	0.1977	0.3462	0.4561	0.5994	0.7856
29	0.0564	0.0764	0.1033	0.1390	0.1866	0.3333	0.4435	0.5886	0.7789
30	0.0511	0.0700	0.0955	0.1299	0.1761	0.3209	0.4313	0.5779	0.7722
35	0.0311	0.0449	0.0645	0.0924	0.1319	0.2655	0.3749	0.5274	0.7396
40	0.0190	0.0288	0.0436	0.0658	0.0987	0.2197	0.3258	0.4814	0.7085
45	0.0116	0.0185	0.0295	0.0468	0.0739	0.1818	0.2832	0.4393	0.6786
50	0.0070	0.0119	0.0199	0.0333	0.0553	0.1504	0.2462	0.4009	0.6500

Notes: <1> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount Rate = 4.9%).

<3> Covers Costs such as Construction, Procurement, Replacement, Disposal.

Table NE-2-1. Present Worth Factors--Annually Recurring Costs
Zero Differential Escalation ($e = 0\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9560	0.9140	0.8738	0.8354	0.7986	0.7635	0.7299	0.6978	0.6671	0.6198
2	1.8700	1.7878	1.7091	1.6340	1.5621	1.4934	1.4277	1.3650	1.2700	1.2106
3	2.7438	2.6231	2.5078	2.3975	2.2920	2.1913	2.0949	1.9520	1.8608	1.7739
4	3.5791	3.4217	3.2713	3.1274	2.9899	2.8584	2.6674	2.5428	2.4240	2.3108
5	4.3778	4.1852	4.0012	3.8252	3.6570	3.4179	3.2582	3.1061	2.9610	2.8227
6	5.1413	4.9152	4.6990	4.4924	4.2052	4.0087	3.8215	3.6430	3.4728	3.3106
7	5.8712	5.6130	5.3662	5.0310	4.7960	4.5720	4.3584	4.1548	3.9608	3.7757
8	6.5690	6.2801	5.8973	5.6219	5.3592	5.1089	4.8703	4.6428	4.4259	4.2192
9	7.2362	6.8061	6.4882	6.1851	5.8962	5.6208	5.3582	5.1079	4.8693	4.6419
10	7.7594	7.3969	7.0514	6.7220	6.4080	6.1087	5.8234	5.5513	5.2920	5.0448
11	8.3502	7.9602	7.5883	7.2339	6.8960	6.5739	6.2668	5.9741	5.6950	5.4290
12	8.9135	8.4971	8.1002	7.7218	7.3611	7.0173	6.6895	6.3770	6.0791	5.7952
13	9.4504	9.0089	8.5881	8.1870	7.8045	7.4400	7.0925	6.7612	6.4453	6.1443
14	9.9622	9.4969	9.0533	8.6304	8.2273	7.8429	7.4766	7.1274	6.7944	6.4771
15	10.4502	9.9620	9.4967	9.0531	8.6302	8.2271	7.8428	7.4764	7.1272	6.7943
16	10.9153	10.4055	9.9194	9.4561	9.0144	8.5933	8.1919	7.8092	7.4445	7.0967
17	11.3587	10.8282	10.3224	9.8402	9.3806	8.9424	8.5247	8.1265	7.7469	7.3850
18	11.7815	11.2311	10.7065	10.2064	9.7296	9.2752	8.8419	8.4289	8.0352	7.6598
19	12.1844	11.6153	11.0727	10.5555	10.0624	9.5924	9.1443	8.7172	8.3100	7.9218
20	12.5686	11.9815	11.4218	10.8883	10.3797	9.8948	9.4326	8.9920	8.5720	8.1716
21	12.9348	12.3306	11.7546	11.2055	10.6821	10.1831	9.7075	9.2540	8.8217	8.4097
22	13.2838	12.6633	12.0718	11.5079	10.9704	10.4579	9.9694	9.5038	9.0598	8.6366
23	13.6166	12.9806	12.3742	11.7962	11.2452	10.7199	10.2192	9.7418	9.2868	8.8530
24	13.9339	13.2830	12.6625	12.0711	11.5072	10.9697	10.4573	9.9688	9.5032	9.0593
25	14.2363	13.5713	12.9374	12.3330	11.7570	11.2078	10.6842	10.1852	9.7094	9.2559
30	15.5492	14.8229	14.1305	13.4705	12.8413	12.2414	11.6696	11.1245	10.6049	10.1095
35	16.5829	15.8083	15.0699	14.3659	13.6949	13.0552	12.4454	11.8640	11.3098	10.7815
40	17.3967	16.5840	15.8094	15.0709	14.3669	13.6958	13.0561	12.4462	11.8648	11.3106
45	18.0373	17.1948	16.3916	15.6259	14.8960	14.2002	13.5369	12.9046	12.3018	11.7271
50	18.5417	17.6756	16.8499	16.0628	15.3125	14.5973	13.9154	13.2654	12.6458	12.0551

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-2. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = -5\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9082	0.8249	0.7492	0.6804	0.6180	0.5612	0.5097	0.4630	0.4205	0.3711
2	1.7331	1.5740	1.4296	1.2984	1.1792	1.0710	0.9727	0.8834	0.7809	0.7072
3	2.4823	2.2544	2.0475	1.8596	1.6889	1.5339	1.3931	1.2333	1.1169	1.0115
4	3.1627	2.8724	2.6088	2.3693	2.1519	1.9544	1.7329	1.5694	1.4213	1.2871
5	3.7806	3.4336	3.1185	2.8323	2.5724	2.2846	2.0690	1.8737	1.6969	1.5368
6	4.3419	3.9434	3.5815	3.2528	2.8938	2.6207	2.3734	2.1494	1.9465	1.7628
7	4.8516	4.4063	4.0019	3.5664	3.2299	2.9250	2.6490	2.3990	2.1726	1.9675
8	5.3145	4.8268	4.3092	3.9025	3.5342	3.2007	2.8986	2.6250	2.3773	2.1529
9	5.7350	5.1294	4.6453	4.2069	3.8098	3.4503	3.1247	2.8298	2.5627	2.3209
10	6.0350	5.4654	4.9496	4.4825	4.0595	3.6763	3.3294	3.0152	2.7306	2.4729
11	6.3710	5.7698	5.2253	4.7321	4.2855	3.8811	3.5148	3.1831	2.8827	2.6106
12	6.6754	6.0454	5.4749	4.9582	4.4902	4.0665	3.6827	3.3351	3.0204	2.7353
13	6.9510	6.2950	5.7009	5.1629	4.6756	4.2344	3.8348	3.4729	3.1451	2.8483
14	7.2006	6.5211	5.9057	5.3483	4.8436	4.3864	3.9725	3.5976	3.2580	2.9506
15	7.4267	6.7258	6.0911	5.5162	4.9956	4.5241	4.0972	3.7105	3.3603	3.0432
16	7.6314	6.9112	6.2590	5.6683	5.1333	4.6489	4.2101	3.8128	3.4530	3.1271
17	7.8168	7.0791	6.4110	5.8060	5.2580	4.7618	4.3124	3.9054	3.5368	3.2031
18	7.9847	7.2312	6.5487	5.9307	5.3710	4.8641	4.4050	3.9893	3.6128	3.2719
19	8.1368	7.3689	6.6734	6.0436	5.4733	4.9567	4.4889	4.0653	3.6816	3.3342
20	8.2745	7.4936	6.7864	6.1459	5.5659	5.0406	4.5649	4.1341	3.7439	3.3906
21	8.3992	7.6065	6.8887	6.2385	5.6498	5.1166	4.6337	4.1964	3.8004	3.4417
22	8.5122	7.7088	6.9813	6.3224	5.7258	5.1854	4.6960	4.2528	3.8515	3.4880
23	8.6144	7.8015	7.0652	6.3984	5.7946	5.2477	4.7524	4.3039	3.8977	3.5299
24	8.7071	7.8853	7.1412	6.4672	5.8569	5.3041	4.8035	4.3502	3.9396	3.5678
25	8.7910	7.9613	7.2100	6.5295	5.9133	5.3552	4.8498	4.3921	3.9776	3.6022
30	9.1056	8.2462	7.4680	6.7632	6.1249	5.5469	5.0234	4.5493	4.1200	3.7311
35	9.2972	8.4198	7.6252	6.9055	6.2538	5.6636	5.1291	4.6451	4.2067	3.8097
40	9.4140	8.5255	7.7209	6.9923	6.3324	5.7347	5.1935	4.7034	4.2595	3.8575
45	9.4851	8.5899	7.7793	7.0451	6.3802	5.7781	5.2328	4.7389	4.2917	3.8866
50	9.5284	8.6292	7.8148	7.0773	6.4093	5.8045	5.2567	4.7606	4.3113	3.9044

Notes: <1> Data Based on Assumed DOS of Apr 1996.

Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-3. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = -4\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9178	0.8423	0.7731	0.7095	0.6512	0.5976	0.5485	0.5034	0.4620	0.4121
2	1.7601	1.6154	1.4826	1.3607	1.2488	1.1461	1.0519	0.9654	0.8623	0.7892
3	2.5332	2.3249	2.1338	1.9583	1.7973	1.6495	1.5139	1.3543	1.2394	1.1343
4	3.2427	2.9761	2.7314	2.5068	2.3007	2.1116	1.8919	1.7314	1.5845	1.4501
5	3.8939	3.5737	3.2799	3.0102	2.7627	2.4794	2.2690	2.0765	1.9003	1.7391
6	4.4915	4.1222	3.7833	3.4722	3.1213	2.8565	2.6141	2.3923	2.1894	2.0036
7	5.0400	4.6256	4.2453	3.8227	3.4984	3.2016	2.9300	2.6814	2.4539	2.2457
8	5.5434	5.0876	4.5892	4.1998	3.8435	3.5174	3.2190	2.9459	2.6959	2.4672
9	6.0054	5.4267	4.9663	4.5449	4.1593	3.8064	3.4835	3.1879	2.9175	2.6699
10	6.3419	5.8038	5.3114	4.8608	4.4484	4.0709	3.7256	3.4095	3.1202	2.8555
11	6.7190	6.1489	5.6272	5.1498	4.7129	4.3130	3.9471	3.6122	3.3057	3.0253
12	7.0641	6.4647	5.9162	5.4143	4.9549	4.5345	4.1498	3.7977	3.4755	3.1806
13	7.3799	6.7538	6.1807	5.6564	5.1765	4.7373	4.3353	3.9675	3.6309	3.3229
14	7.6689	7.0183	6.4228	5.8779	5.3792	4.9228	4.5051	4.1229	3.7731	3.4530
15	7.9334	7.2603	6.6443	6.0806	5.5647	5.0926	4.6605	4.2651	3.9032	3.5721
16	8.1755	7.4818	6.8471	6.2661	5.7345	5.2480	4.8027	4.3952	4.0223	3.6811
17	8.3970	7.6846	7.0326	6.4359	5.8899	5.3902	4.9329	4.5143	4.1313	3.7808
18	8.5997	7.8701	7.2024	6.5913	6.0321	5.5203	5.0520	4.6233	4.2311	3.8721
19	8.7853	8.0399	7.3578	6.7335	6.1622	5.6394	5.1610	4.7231	4.3224	3.9556
20	8.9551	8.1953	7.5000	6.8637	6.2813	5.7484	5.2607	4.8144	4.4059	4.0321
21	9.1104	8.3375	7.6301	6.9828	6.3903	5.8481	5.3520	4.8979	4.4823	4.1021
22	9.2527	8.4676	7.7492	7.0917	6.4901	5.9394	5.4355	4.9744	4.5523	4.1661
23	9.3828	8.5867	7.8582	7.1915	6.5813	6.0230	5.5120	5.0443	4.6163	4.2247
24	9.5019	8.6957	7.9579	7.2828	6.649	6.0994	5.5819	5.1083	4.6749	4.2783
25	9.6109	8.7955	8.0492	7.3663	6.7413	6.1694	5.6460	5.1669	4.7286	4.3274
30	10.0319	9.1807	8.4018	7.6890	7.0366	6.4396	5.8933	5.3933	4.9357	4.5169
35	10.3021	9.4280	8.6281	7.8961	7.2262	6.6131	6.0520	5.5385	5.0686	4.6386
40	10.4756	9.5868	8.7734	8.0290	7.3478	6.7244	6.1539	5.6318	5.1540	4.7167
45	10.5869	9.6887	8.8667	8.1144	7.4259	6.7959	6.2193	5.6917	5.2088	4.7668
50	10.6584	9.7541	8.9265	8.1692	7.4761	6.8418	6.2613	5.7301	5.2439	4.7990

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-4. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = -3\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9273	0.8600	0.7975	0.7395	0.6858	0.6360	0.5898	0.5469	0.5072	0.4570
2	1.7873	1.6574	1.5370	1.4253	1.3218	1.2257	1.1367	1.0541	0.9513	0.8797
3	2.5848	2.3970	2.2228	2.0613	1.9115	1.7727	1.6439	1.4858	1.3739	1.2705
4	3.3243	3.0828	2.8588	2.6511	2.4585	2.2798	2.0639	1.9085	1.7647	1.6318
5	4.0101	3.7188	3.4486	3.1980	2.9656	2.6890	2.4865	2.2993	2.1261	1.9660
6	4.6461	4.3085	3.9955	3.7052	3.3651	3.1117	2.8773	2.6606	2.4603	2.2750
7	5.2359	4.8554	4.5027	4.0962	3.7877	3.5025	3.2387	2.9948	2.7693	2.5607
8	5.7828	5.3626	4.8869	4.5188	4.1785	3.8638	3.5729	3.3038	3.0550	2.8249
9	6.2900	5.7419	5.3095	4.9096	4.5399	4.1980	3.8819	3.5895	3.3192	3.0692
10	6.6666	6.1646	5.7003	5.2710	4.8741	4.5070	4.1676	3.8537	3.5635	3.2951
11	7.0892	6.5554	6.0617	5.6052	5.1830	4.7927	4.4318	4.0980	3.7894	3.5040
12	7.4800	6.9167	6.3958	5.9142	5.4688	5.0569	4.6761	4.3239	3.9983	3.6972
13	7.8414	7.2509	6.7048	6.1999	5.7330	5.3012	4.9020	4.5328	4.1915	3.8758
14	8.1756	7.5599	6.9905	6.4641	5.9773	5.5271	5.1109	4.7260	4.3701	4.0410
15	8.4846	7.8456	7.2547	6.7084	6.2032	5.7360	5.3040	4.9046	4.5352	4.1937
16	8.7703	8.1098	7.4990	6.9343	6.4121	5.9292	5.4827	5.0698	4.6880	4.3349
17	9.0345	8.3541	7.7250	7.1432	6.6052	6.1078	5.6478	5.2225	4.8292	4.4655
18	9.2788	8.5800	7.9338	7.3363	6.7838	6.2730	5.8005	5.3637	4.9598	4.5862
19	9.5047	8.7889	8.1270	7.5150	6.9490	6.4257	5.9418	5.4943	5.0805	4.6979
20	9.7136	8.9821	8.3056	7.6801	7.1017	6.5669	6.0724	5.6150	5.1922	4.8012
21	9.9067	9.1607	8.4708	7.8329	7.2430	6.6975	6.1931	5.7267	5.2954	4.8966
22	10.0854	9.3258	8.6235	7.9741	7.3735	6.8182	6.3048	5.8300	5.3909	4.9849
23	10.2505	9.4786	8.7647	8.1047	7.4943	6.9299	6.4080	5.9254	5.4792	5.0666
24	10.4033	9.6198	8.8953	8.2254	7.6060	7.0332	6.5035	6.0137	5.5608	5.1420
25	10.5445	9.7504	9.0161	8.3371	7.7092	7.1286	6.5918	6.0954	5.6363	5.2118
30	11.1062	10.2698	9.4964	8.7812	8.1199	7.5084	6.9429	6.4201	5.9366	5.4895
35	11.4860	10.6210	9.8211	9.0815	8.3975	7.7651	7.1803	6.6396	6.1396	5.6772
40	11.7427	10.8584	10.0406	9.2845	8.5852	7.9387	7.3408	6.7880	6.2768	5.8041
45	11.9163	11.0188	10.1890	9.4217	8.7121	8.0560	7.4493	6.8883	6.3696	5.8899
50	12.0336	11.1274	10.2894	9.5145	8.7979	8.1354	7.5227	6.9562	6.4323	5.9479

Notes: <1> Data Based on Assumed DOS of Apr 1996.
<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design
(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-5. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = -2\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9369	0.8778	0.8224	0.7705	0.7219	0.6763	0.6337	0.5937	0.5562	0.5064
2	1.8147	1.7002	1.5929	1.4924	1.3982	1.3100	1.2274	1.1499	1.0485	0.9795
3	2.6371	2.4707	2.3148	2.1687	2.0319	1.9037	1.7836	1.6287	1.5216	1.4215
4	3.4076	3.1926	2.9911	2.8024	2.6256	2.4599	2.2498	2.1018	1.9636	1.8344
5	4.1295	3.8689	3.6248	3.3961	3.1818	2.9146	2.7229	2.5438	2.3765	2.2202
6	4.8058	4.5026	4.2185	3.9523	3.6263	3.3877	3.1649	2.9567	2.7622	2.5805
7	5.4395	5.0963	4.7747	4.3880	4.0994	3.8297	3.5778	3.3425	3.1226	2.9172
8	6.0332	5.6525	5.2034	4.8611	4.5413	4.2426	3.9636	3.7029	3.4593	3.2317
9	6.5894	6.0761	5.6765	5.3031	4.9543	4.6284	4.3239	4.0395	3.7738	3.5256
10	7.0103	6.5492	6.1184	5.7160	5.3400	4.9888	4.6606	4.3541	4.0677	3.8001
11	7.4835	6.9912	6.5314	6.1017	5.7004	5.3254	4.9751	4.6479	4.3422	4.0566
12	7.9254	7.4041	6.9171	6.4621	6.0371	5.6400	5.2690	4.9224	4.5986	4.2961
13	8.3383	7.7899	7.2775	6.7988	6.3516	5.9338	5.5435	5.1789	4.8382	4.5200
14	8.7241	8.1503	7.6142	7.1133	6.6454	6.2083	5.8000	5.4184	5.0620	4.7291
15	9.0845	8.4869	7.9287	7.4072	6.9199	6.4648	6.0395	5.6423	5.2711	4.9244
16	9.4212	8.8015	8.2225	7.6817	7.1764	6.7044	6.2634	5.8514	5.4665	5.1069
17	9.7357	9.0953	8.4970	7.9381	7.4160	6.9282	6.4725	6.0467	5.6490	5.2774
18	10.0295	9.3698	8.7535	8.1777	7.6398	7.1373	6.6678	6.2292	5.8195	5.4367
19	10.3040	9.6263	8.9931	8.4015	7.8489	7.3326	6.8503	6.3997	5.9788	5.5855
20	10.5605	9.8659	9.2169	8.6106	8.0443	7.5151	7.0208	6.5590	6.1276	5.7245
21	10.8001	10.0897	9.4260	8.8060	8.2268	7.6856	7.1801	6.7078	6.2666	5.8544
22	11.0239	10.2988	9.6214	8.9885	8.3973	7.8449	7.3289	6.8468	6.3965	5.9757
23	11.2330	10.4941	9.8039	9.1590	8.5565	7.9937	7.4679	6.9767	6.5178	6.0891
24	11.4284	10.6766	9.9744	9.3183	8.7053	8.1327	7.5978	7.0980	6.6311	6.1950
25	11.6109	10.8471	10.1336	9.4671	8.8444	8.2626	7.7191	7.2114	6.7370	6.2939
30	12.3583	11.5454	10.7860	10.0765	9.4137	8.7945	8.2161	7.6756	7.1707	6.6991
35	12.8903	12.0424	11.2503	10.5103	9.8189	9.1731	8.5697	8.0060	7.4794	6.9874
40	13.2688	12.3960	11.5806	10.8189	10.1073	9.4424	8.8213	8.2411	7.6990	7.1926
45	13.5382	12.6477	11.8157	11.0385	10.3125	9.6341	9.004	8.4084	7.8553	7.3386
50	13.7298	12.8267	11.9830	11.1948	10.4585	9.7705	9.1279	8.5275	7.9666	7.4425

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<4> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-6. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = -1\%$)

Number of Payments	Beneficial Occupancy Date											
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005		
1	0.9465	0.8958	0.8478	0.8024	0.7595	0.7188	0.6803	0.6439	0.6094	0.5605		
2	1.8423	1.7436	1.6503	1.5619	1.4783	1.3992	1.3243	1.2534	1.1545	1.0895		
3	2.6901	2.5461	2.4098	2.2807	2.1586	2.0431	1.9337	1.7838	1.6835	1.5888		
4	3.4925	3.3056	3.1286	2.9611	2.8026	2.6525	2.4506	2.3128	2.1827	2.0599		
5	4.2520	4.0244	3.8089	3.6050	3.4120	3.1572	2.9796	2.8120	2.6539	2.5046		
6	4.9708	4.7047	4.4528	4.2144	3.9059	3.6862	3.4789	3.2832	3.0985	2.9243		
7	5.6512	5.3486	5.0623	4.6992	4.4349	4.1854	3.9500	3.7279	3.5182	3.3203		
8	6.2951	5.9581	5.5398	5.2282	4.9341	4.6566	4.3947	4.1475	3.9143	3.6941		
9	6.9045	6.4304	6.0688	5.7274	5.4053	5.1013	4.8144	4.5436	4.2880	4.0469		
10	7.3742	6.9594	6.5680	6.1986	5.8500	5.5209	5.2104	4.9174	4.6408	4.3798		
11	7.9032	7.4587	7.0392	6.6433	6.2696	5.9170	5.5842	5.2701	4.9737	4.6940		
12	8.4024	7.9299	7.4839	7.0629	6.6657	6.2908	5.9370	5.6030	5.2879	4.9905		
13	8.8736	8.3745	7.9035	7.4590	7.0395	6.6435	6.2699	5.9172	5.5844	5.2703		
14	9.3183	8.7942	8.2996	7.8328	7.3922	6.9764	6.5841	6.2138	5.8643	5.5344		
15	9.7379	9.1902	8.6733	8.1855	7.7251	7.2906	6.8806	6.4936	6.1284	5.7837		
16	10.1340	9.5640	9.0261	8.5184	8.0393	7.5872	7.1604	6.7577	6.3776	6.0189		
17	10.5078	9.9168	9.3590	8.8326	8.3358	7.8670	7.4245	7.0069	6.6128	6.2409		
18	10.8605	10.2497	9.6732	9.1291	8.6157	8.1311	7.6738	7.2422	6.8348	6.4504		
19	11.1934	10.5639	9.9697	9.4090	8.8798	8.3804	7.9090	7.4642	7.0444	6.6482		
20	11.5076	10.8604	10.2496	9.6731	9.1290	8.6156	8.1310	7.6737	7.2421	6.8348		
21	11.8042	11.1402	10.5137	9.9223	9.3643	8.8376	8.3405	7.8714	7.4287	7.0109		
22	12.0840	11.4043	10.7629	10.1576	9.5863	9.0471	8.5383	8.0580	7.6048	7.1771		
23	12.3481	11.6536	10.9982	10.3796	9.7958	9.2448	8.7249	8.2341	7.7710	7.3339		
24	12.5974	11.8888	11.2201	10.5891	9.9935	9.4314	8.9010	8.4003	7.9279	7.4820		
25	12.8326	12.1108	11.4297	10.7868	10.1801	9.6075	9.0672	8.5572	8.0759	7.6217		
30	13.8245	13.0470	12.3132	11.6206	10.9670	10.3502	9.7681	9.2187	8.7002	8.2109		
35	14.5672	13.7479	12.9747	12.2449	11.5562	10.9062	10.2928	9.7139	9.1676	8.6519		
40	15.1232	14.2726	13.4699	12.7123	11.9973	11.3225	10.6857	10.0847	9.5175	8.9822		
45	15.5395	14.6655	13.8407	13.0622	12.3275	11.6342	10.9798	10.3623	9.7795	9.2294		
50	15.8512	14.9597	14.1183	13.3242	12.5748	11.8675	11.2001	10.5701	9.9756	9.4145		

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

NON-ENERGY STUDIES

NON-ENERGY STUDIES

Table NE-2-7. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = 1\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9656	0.9324	0.9003	0.8693	0.8394	0.8105	0.7826	0.7556	0.7296	0.6846
2	1.8979	1.8326	1.7695	1.7086	1.6498	1.5931	1.5382	1.4853	1.3957	1.3438
3	2.7982	2.7019	2.6089	2.5191	2.4324	2.3487	2.2679	2.1342	2.0549	1.9785
4	3.6675	3.5413	3.4194	3.3017	3.1881	3.0783	2.9013	2.7934	2.6896	2.5896
5	4.5068	4.3517	4.2020	4.0573	3.9177	3.6979	3.5605	3.4281	3.3006	3.1779
6	5.3173	5.1343	4.9576	4.7870	4.5254	4.3571	4.1951	4.0392	3.8890	3.7444
7	6.0999	5.8899	5.6872	5.3847	5.1846	4.9918	4.8062	4.6275	4.4555	4.2898
8	6.8555	6.6196	6.2773	6.0439	5.8192	5.6029	5.3946	5.1940	5.0009	4.8150
9	7.5852	7.2043	6.9365	6.6786	6.4303	6.1912	5.9611	5.7394	5.5261	5.3206
10	8.1672	7.8635	7.5712	7.2897	7.0187	6.7577	6.5065	6.2646	6.0317	5.8074
11	8.8263	8.4982	8.1822	7.8780	7.5851	7.3031	7.0316	6.7702	6.5185	6.2762
12	9.4610	9.1093	8.7706	8.4445	8.1306	7.8283	7.5372	7.2570	6.9872	6.7274
13	10.0721	9.6976	9.3371	8.9899	8.6557	8.3339	8.0241	7.7258	7.4385	7.1620
14	10.6604	10.2641	9.8825	9.5151	9.1613	8.8207	8.4928	8.1770	7.8730	7.5803
15	11.2269	10.8095	10.4077	10.0207	9.6482	9.2895	8.9441	8.6116	8.2914	7.9831
16	11.7724	11.3347	10.9133	10.5075	10.1169	9.7408	9.3786	9.0299	8.6942	8.3710
17	12.2975	11.8403	11.4001	10.9763	10.5682	10.1753	9.7970	9.4327	9.0821	8.7444
18	12.8031	12.3271	11.8688	11.4276	11.0027	10.5936	10.1998	9.8206	9.4555	9.1039
19	13.2899	12.7959	12.3201	11.8621	11.4211	10.9965	10.5876	10.1940	9.8150	9.4501
20	13.7587	13.2471	12.7546	12.2804	11.8239	11.3843	10.9610	10.5535	10.1612	9.7834
21	14.2100	13.6817	13.1730	12.6833	12.2117	11.7577	11.3206	10.8997	10.4945	10.1043
22	14.6445	14.1000	13.5758	13.0711	12.5851	12.1172	11.6667	11.2330	10.8154	10.4133
23	15.0629	14.5028	13.9637	13.4445	12.9447	12.4634	12.0000	11.5539	11.1243	10.7108
24	15.4657	14.8907	14.3371	13.8040	13.2908	12.7967	12.3209	11.8629	11.4218	10.9972
25	15.8535	15.2641	14.6966	14.1502	13.6241	13.1176	12.6299	12.1604	11.7083	11.2730
30	17.5868	16.9330	16.3034	15.6973	15.1137	14.5518	14.0108	13.4899	12.9884	12.5055
35	19.0210	18.3138	17.6330	16.9774	16.3462	15.7385	15.1534	14.5900	14.0476	13.5253
40	20.2077	19.4564	18.7331	18.0366	17.3660	16.7204	16.0988	15.5002	14.9240	14.3691
45	21.1896	20.4018	19.6433	18.9130	18.2098	17.5328	16.8810	16.2534	15.6491	15.0673
50	22.0020	21.1840	20.3965	19.6382	18.9080	18.2051	17.5282	16.8766	16.2491	15.6450

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design (Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-8. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = 2\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9751	0.9509	0.9273	0.9042	0.8817	0.8598	0.8385	0.8176	0.7973	0.7555
2	1.9260	1.8782	1.8315	1.7860	1.7416	1.6983	1.6561	1.6149	1.5325	1.4902
3	2.8533	2.7824	2.7132	2.6458	2.5800	2.5159	2.4534	2.3316	2.2672	2.2045
4	3.7575	3.6641	3.5731	3.4842	3.3976	3.3132	3.1534	3.0663	2.9815	2.8991
5	4.6393	4.5240	4.4115	4.3019	4.1949	3.9986	3.8881	3.7806	3.6761	3.5744
6	5.4991	5.3624	5.2291	5.0991	4.8678	4.7332	4.6024	4.4752	4.3514	4.2311
7	6.3376	6.1800	6.0264	5.7617	5.6024	5.4476	5.2970	5.1505	5.0081	4.8697
8	7.1552	6.9773	6.6811	6.4964	6.3168	6.1421	5.9723	5.8072	5.6467	5.4906
9	7.9525	7.6265	7.4157	7.2107	7.0114	6.8175	6.6290	6.4458	6.2676	6.0943
10	8.5989	8.3612	8.1300	7.9053	7.6867	7.4742	7.2676	7.0667	6.8713	6.6814
11	9.3335	9.0755	8.8246	8.5806	8.3434	8.1128	7.8885	7.6704	7.4584	7.2522
12	10.0479	9.7701	9.5000	9.2374	8.9820	8.7337	8.4922	8.2575	8.0292	7.8072
13	10.7424	10.4455	10.1567	9.8759	9.6029	9.3374	9.0793	8.8283	8.5842	8.3469
14	11.4178	11.1022	10.7952	10.4968	10.2066	9.9244	9.6501	9.3833	9.1239	8.8717
15	12.0745	11.7407	11.4161	11.1005	10.7937	10.4953	10.2051	9.9230	9.6487	9.3819
16	12.7131	12.3616	12.0199	11.6876	11.3645	11.0503	10.7448	10.4478	10.1589	9.8781
17	13.3340	12.9653	12.6069	12.2584	11.9195	11.5900	11.2696	10.9580	10.6551	10.3605
18	13.9377	13.5524	13.1777	12.8134	12.4592	12.1147	11.7798	11.4542	11.1375	10.8296
19	14.5247	14.1232	13.7328	13.3531	12.9840	12.6250	12.2760	11.9366	11.6066	11.2858
20	15.0956	14.6782	14.2724	13.8779	13.4942	13.1212	12.7584	12.4057	12.0628	11.7293
21	15.6506	15.2179	14.7972	14.3881	13.904	13.6036	13.2275	12.8618	12.5063	12.1605
22	16.1903	15.7427	15.3075	14.8843	14.4728	14.0727	13.6837	13.3054	12.9375	12.5799
23	16.7150	16.2529	15.8036	15.3667	14.9419	14.5288	14.1272	13.7366	13.3569	12.9876
24	17.2253	16.7491	16.2861	15.8358	15.3980	14.9724	14.5584	14.1560	13.7646	13.3841
25	17.7215	17.2315	16.7552	16.2920	15.8416	15.4036	14.9778	14.5637	14.1611	13.7696
30	20.0039	19.4509	18.9132	18.3903	17.8819	17.3875	16.9069	16.4395	15.9850	15.5431
35	21.9878	21.3800	20.7889	20.2142	19.6554	19.1120	18.5836	18.0699	17.5703	17.0846
40	23.7123	23.0567	22.4193	21.7995	21.1969	20.6109	20.0411	19.4871	18.9483	18.4245
45	25.2112	24.5142	23.8365	23.1775	22.5368	21.9137	21.3079	20.7189	20.1461	19.5891
50	26.5140	25.7810	25.0683	24.3753	23.7014	23.0462	22.4091	21.7896	21.1872	20.6015

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<3> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum

of Agreement on Criteria/Standards for EA/LCC for MILCON Design
(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

Table NE-2-9. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = 3\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9847	0.9696	0.9548	0.9402	0.9258	0.9117	0.8977	0.8840	0.8705	0.8329
2	1.9543	1.9245	1.8950	1.8660	1.8375	1.8094	1.7817	1.7544	1.6813	1.6508
3	2.9092	2.8647	2.8208	2.7777	2.7352	2.6934	2.6522	2.5452	2.4991	2.4539
4	3.8494	3.7905	3.7325	3.6754	3.6192	3.5638	3.4251	3.3631	3.3022	3.2424
5	4.7752	4.7021	4.6302	4.5594	4.4896	4.3212	4.2430	4.1661	4.0907	4.0166
6	5.6868	5.5999	5.5142	5.4298	5.2339	5.1391	5.0460	4.9546	4.8649	4.7768
7	6.5846	6.4838	6.3847	6.1634	6.0518	5.9422	5.8345	5.7288	5.6251	5.5232
8	7.4685	7.3543	7.1100	6.9813	6.8548	6.7307	6.6087	6.4890	6.3715	6.2561
9	8.3390	8.0741	7.9279	7.7843	7.6433	7.5049	7.3689	7.2355	7.1044	6.9757
10	9.0560	8.8920	8.7309	8.5728	8.4175	8.2651	8.1154	7.9684	7.8241	7.6823
11	9.8739	9.6951	9.5194	9.3470	9.1777	9.0115	8.8483	8.6880	8.5307	8.3761
12	10.6769	10.4836	10.2937	10.1072	9.9242	9.7444	9.5679	9.3946	9.2245	9.0574
13	11.4654	11.2578	11.0539	10.8537	10.6571	10.4640	10.2745	10.0884	9.9057	9.7263
14	12.2397	12.0180	11.8003	11.5866	11.3767	11.1706	10.9683	10.7696	10.5746	10.3831
15	12.9999	12.7644	12.5332	12.3062	12.0833	11.8644	11.6495	11.4385	11.2314	11.0279
16	13.7463	13.4973	13.2528	13.0128	12.7771	12.5457	12.3184	12.0953	11.8762	11.6611
17	14.4792	14.2169	13.9594	13.7066	13.4583	13.2146	12.9752	12.7402	12.5095	12.2829
18	15.1988	14.9235	14.6532	14.3878	14.1272	13.8713	13.6201	13.3734	13.1312	12.8933
19	15.9054	15.6173	15.3345	15.0567	14.7840	14.5162	14.2533	13.9951	13.7417	13.4928
20	16.5992	16.2986	16.0034	15.7135	15.4289	15.1494	14.8750	14.6056	14.3411	14.0813
21	17.2805	16.9675	16.6601	16.3584	16.0621	15.7712	15.4855	15.2050	14.9296	14.6592
22	17.9494	17.6242	17.3050	16.9916	16.6838	16.3816	16.0849	15.7936	15.5075	15.2267
23	18.6061	18.2691	17.9382	17.6133	17.2943	16.9811	16.6735	16.3715	16.0750	15.7838
24	19.2510	18.9023	18.5600	18.2238	17.8937	17.5696	17.2514	16.9389	16.6321	16.3309
25	19.8842	19.5241	19.1704	18.8232	18.4823	18.1475	17.8188	17.4961	17.1792	16.8680
30	22.8823	22.4679	22.0609	21.6613	21.2690	20.8838	20.5055	20.1341	19.7694	19.4113
35	25.6185	25.1545	24.6989	24.2516	23.8123	23.3810	22.9575	22.5417	21.1334	21.7325
40	28.1158	27.6065	27.1065	26.6155	26.1335	25.6601	25.1954	24.7390	24.2909	23.8510
45	30.3949	29.8444	29.3038	28.7731	28.2519	27.7402	27.2378	26.7444	26.2600	25.7844
50	32.4750	31.8868	31.3092	30.7421	30.1953	29.6386	29.1018	28.5747	28.0571	27.5489

Notes: <1> Data Based on Assumed DOS of Apr 1996.
Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum
of Agreement on Criteria/Standards for EA/LCC for MILCON Design
(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-10. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = 4\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	0.9943	0.9886	0.9829	0.9773	0.9716	0.9661	0.9605	0.9550	0.9495	0.9174
2	1.9828	1.9715	1.9601	1.9489	1.9377	1.9266	1.9156	1.9046	1.8428	1.8270
3	2.9657	2.9487	2.9318	2.9150	2.8983	2.8816	2.8651	2.7762	2.7524	2.7288
4	3.9430	3.9203	3.8979	3.8755	3.8533	3.8312	3.7177	3.6858	3.6542	3.6228
5	4.9146	4.8864	4.8584	4.8305	4.8028	4.6673	4.6272	4.5875	4.5482	4.5092
6	5.8807	5.8470	5.8134	5.7801	5.6251	5.5769	5.5290	5.4816	5.4345	5.3879
7	6.8412	6.8020	6.7630	6.5912	6.5347	6.4786	6.4230	6.3679	6.3133	6.2591
8	7.7962	7.7515	7.5657	7.5008	7.4365	7.3727	7.3094	7.2467	7.1845	7.1229
9	8.7458	8.5486	8.4753	8.4026	8.3305	8.2590	8.1882	8.1179	8.0483	7.9792
10	9.5401	9.4582	9.3771	9.2966	9.2169	9.1378	9.0594	8.9817	8.9046	8.8282
11	10.4496	10.3600	10.2711	10.1830	10.0956	10.0090	9.9231	9.8380	9.7536	9.6699
12	11.3514	11.2540	11.1575	11.0617	10.9668	10.8727	10.7794	10.6870	10.5953	10.5044
13	12.2454	12.1404	12.0362	11.9329	11.8306	11.7291	11.6284	11.5287	11.4298	11.3317
14	13.1318	13.0191	12.9074	12.7967	12.6869	12.5780	12.4701	12.3631	12.2571	12.1519
15	14.0105	13.8903	13.7712	13.6530	13.5359	13.4197	13.3046	13.1905	13.0773	12.9651
16	14.8818	14.7541	14.6275	14.5020	14.3776	14.2542	14.1319	14.0107	13.8905	13.7713
17	15.7455	15.6104	15.4765	15.3437	15.2121	15.0815	14.9521	14.8239	14.6967	14.5706
18	16.6018	16.4594	16.3182	16.1782	16.0394	15.9018	15.7653	15.6301	15.4960	15.3630
19	17.4508	17.3011	17.1527	17.0055	16.8596	16.7149	16.5715	16.4294	16.2884	16.1487
20	18.2925	18.1356	17.9800	17.8257	17.6728	17.5212	17.3708	17.2218	17.0740	16.9275
21	19.1270	18.9629	18.8002	18.6389	18.4790	18.3204	18.1633	18.0074	17.8529	17.6998
22	19.9543	19.7831	19.6134	19.4451	19.2783	19.1129	18.9489	18.7863	18.6251	18.4653
23	20.7745	20.5963	20.4196	20.2444	20.0707	19.8985	19.7278	19.5585	19.3907	19.2244
24	21.5877	21.4025	21.2189	21.0368	20.8563	20.6774	20.5000	20.3241	20.1497	19.9769
25	22.3939	22.2018	22.0113	21.8225	21.6352	21.4496	21.2656	21.0831	20.9022	20.7229
30	26.3224	26.0965	25.8726	25.6507	25.4306	25.2124	24.9961	24.7816	24.5690	24.3582
35	30.0852	29.8271	29.5712	29.3174	29.0659	28.8165	28.5693	28.3242	28.0812	27.8403
40	33.6893	33.4003	33.1137	32.8296	32.5479	32.2687	31.9918	31.7174	31.4452	31.1755
45	37.1415	36.8228	36.5069	36.1937	35.8831	35.5753	35.2701	34.9674	34.6674	34.3700
50	40.4480	40.1010	39.7570	39.4159	39.0777	38.7424	38.4100	38.0805	37.7538	37.4299

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Table NE-2-11. Present Worth Factors--Annually Recurring Costs
Non-Zero Differential Escalation ($e = 5\%$)

Number of Payments	Beneficial Occupancy Date									
	Oct 1996	Oct 1997	Oct 1998	Oct 1999	Oct 2000	Oct 2001	Oct 2002	Oct 2003	Oct 2004	Oct 2005
1	1.0038	1.007	1.0115	1.0154	1.0193	1.0232	1.0271	1.0310	1.0349	1.0096
2	2.0115	2.0192	2.0269	2.0347	2.0424	2.0502	2.0581	2.0660	2.0182	2.0201
3	3.0230	3.0346	3.0462	3.0578	3.0695	3.0812	3.0930	3.0258	3.0287	3.0316
4	4.0384	4.0538	4.0693	4.0849	4.1005	4.1162	4.0325	4.0364	4.0402	4.0441
5	5.0577	5.0770	5.0964	5.1159	5.1355	5.0383	5.0431	5.0479	5.0527	5.0575
6	6.0808	6.1041	6.1274	6.1508	6.0430	6.0488	6.0546	6.0603	6.0661	6.0719
7	7.1079	7.1351	7.1624	7.0469	7.0536	7.0603	7.0670	7.0738	7.0805	7.0873
8	8.1389	8.1700	8.0497	8.0574	8.0651	8.0728	8.0805	8.0882	8.0959	8.1036
9	9.1739	9.0516	9.0603	9.0689	9.0775	9.0862	9.0949	9.1035	9.1122	9.1209
10	10.0526	10.0622	10.0718	10.0814	10.0910	10.1006	10.1102	10.1199	10.1295	10.1392
11	11.0631	11.0737	11.0842	11.0948	11.1054	11.1160	11.1265	11.1372	11.1478	11.1584
12	12.0746	12.0861	12.0976	12.1092	12.1207	12.1323	12.1438	12.1554	12.1670	12.1786
13	13.0871	13.0996	13.1120	13.1245	13.1371	13.1496	13.1621	13.1747	13.1872	13.1998
14	14.1005	14.1140	14.1274	14.1409	14.1544	14.1678	14.1814	14.1949	14.2084	14.2219
15	15.1149	15.1293	15.1437	15.1582	15.1726	15.1871	15.2016	15.2161	15.2306	15.2451
16	16.1303	16.1456	16.1610	16.1764	16.1919	16.2073	16.2227	16.2382	16.2537	16.2692
17	17.1466	17.1629	17.1793	17.1957	17.2121	17.2285	17.2449	17.2613	17.2778	17.2943
18	18.1639	18.1812	18.1985	18.2159	18.2333	18.2506	18.2680	18.2855	18.3029	18.3203
19	19.1822	19.2005	19.2188	19.2371	19.2554	19.2738	19.2921	19.3105	19.3289	19.3474
20	20.2014	20.2207	20.2399	20.2592	20.2785	20.2979	20.3172	20.3366	20.3560	20.3754
21	21.2216	21.2418	21.2621	21.2824	21.3027	21.3230	21.3433	21.3636	21.3840	21.4044
22	22.2428	22.2640	22.2852	22.3065	22.3277	22.3490	22.3703	22.3917	22.4130	22.4344
23	23.2650	23.2871	23.3093	23.3316	23.3538	23.3761	23.3983	23.4207	23.4430	23.4653
24	24.2881	24.3112	24.3344	24.3576	24.3808	24.4041	24.4273	24.4506	24.4739	24.4973
25	25.3122	25.3363	25.3605	25.3847	25.4089	25.4331	25.4573	25.4816	25.5059	25.5302
30	30.4474	30.4764	30.5055	30.5346	30.5637	30.5928	30.6220	30.6512	30.6804	30.7096
35	35.6071	35.6411	35.6750	35.7090	35.7431	35.7772	35.8113	35.8454	35.8796	35.9138
40	40.7915	40.8304	40.8693	40.9082	40.9472	40.9863	41.0253	41.0645	41.1036	41.1428
45	46.0006	46.0444	46.0883	46.1323	46.1763	46.2203	46.2643	46.3084	46.3526	46.3968
50	51.2346	51.2834	51.3323	51.3813	51.4302	51.4793	51.5283	51.5775	51.6266	51.6758

Notes: <1> Data Based on Assumed DOS of Apr 1996.

<2> Authorized Period of Use of Table is Oct 1995 through Sep 1996.

<2> Tabulated Data Based on Criteria Contained in the March 1994 Tri-Service Memorandum of Agreement on Criteria/Standards for EA/LCC for MILCON Design

(Discount Rate: study periods of 1 to 10 years = 4.6%; study periods greater than 10 years = 4.9%).

<3> Covers Costs such as Routine Maintenance & Repair and Custodial.

Appendix A

MEMORANDUM OF AGREEMENT ON CRITERIA/STANDARDS FOR ECONOMIC ANALYSES/LIFE CYCLE COSTING FOR MILCON DESIGN, MARCH 1994

1. Purpose. The purpose of this Memorandum of Agreement (MOA) is to establish criteria and standards for performing economic analyses and life cycle cost studies used in support of design decisions for projects in the Military Construction (MILCON) Program, i.e., to support the selection from various alternatives of components/systems being considered as elements in facilities design. These criteria and standards apply to all design decisions regardless of when they are made in the overall facilities acquisition process. This agreement does not apply to economic analyses and life cycle cost studies used to make project-justification decisions during that process.

2. General. Economic analyses shall be conducted as part of the design process to ensure that the selection/rejection of design alternatives is not based solely on construction costs, but also on least life cycle costs (LCC), that is, lowest total cost of ownership. The depth and degree of formality of these analyses shall be determined on a case-by-case basis to ensure that the cost of performing an analysis is clearly outweighed by the potential benefits derived. Results of generic studies or results of previous analyses of alternatives similar to those currently under consideration may be used in lieu of performing a new study, provided (a) the previous study was based on similar design conditions, criteria, and methods, and (b) the results of the previous study appear valid and applicable for the current project. Previous studies should be updated only as required to reflect changes of conditions and/or errors significant enough to impact the design decision. All economic analyses and other justification for the selection of a design alternative, whether a previous study or a new one, shall be clearly documented in the appropriate section of the project design analysis.

3. Methods. All analyses shall consider the total LCC for design alternatives, where the LCC includes all costs and benefits associated with an alternative over its expected life, including but not limited to construction/acquisition, energy, maintenance, operation, repair, replacement, alteration, disposal costs, and retention values. The present value discounting approach shall be used to adjust for the difference in timing of costs and benefits unless otherwise specified by other directives or by public law. The basic discount factor for finding the present value of a future amount is calculated as follows:

$$\text{discount factor} = \frac{1}{(1+d)^n}$$

where: d = appropriate discount rate, and
 n = the time period over which the discounting is done.

Discounting should be applied to all costs and benefits over the appropriate analysis period. Specific criteria are as follows:

- a. Discount Rates. The discount rates are expressed in "real" terms, i.e., over-and-above the rate of inflation for the economy as a whole.
 - (1) Energy related studies: All energy related economic studies (studies in which energy costs are relevant, regardless of their magnitude relative to other costs) shall use the current discount rate published by the National Institute of Standards and Technology (NIST) in their annual supplement to NIST Handbook 135, and disseminated by the appropriate Service Headquarters Office.

- (2) Non-energy related studies: All economic studies other than energy related economic studies shall use the current discount rates published annually by the Office of Management and Budget (OMB) as APPENDIX C to OMB CIRCULAR NO. A-94, and disseminated by the appropriate Service Headquarters Office.
- b. Analysis Period. The analysis period shall be the date of the study (DOS) through the economic life of the facility as a whole. The economic life shall not be taken beyond 25 years from the scheduled beneficial occupancy date (BOD) for the project unless specifically approved by the appropriate Service Headquarters Office. Such approval cannot be granted for energy related studies as it is precluded by statute.
- c. Cash Flow. In general, cash flow used in the analysis will be based on the estimated calendar dates on which the events and costs/benefits are projected/scheduled to occur. Construction/acquisition costs may be assumed to be incurred as a single lump sum, preferably at the time corresponding to the midpoint of the construction/acquisition process. Other cash flows that occur periodically throughout the year (e.g., cost of fuel, electricity, water, maintenance, etc.) may be assumed to be incurred as a single lump sum, preferably at midyear. In circumstances where the above assumptions add unnecessarily to the complexity of the calculations, all cash flows may be assumed to occur at the end of the year in which they are actually scheduled/projected to occur.
- d. Benefits and Costs. All benefits and costs will be expressed in terms of constant dollars that reflect the purchasing power of the dollar on the DOS (i.e., constant DOS dollars). The rate of inflation of the economy as a whole will be excluded from all LCC calculations. (The rate of inflation is irrelevant to the LCC analysis results since all benefits and costs are expressed in terms of constant DOS dollars and discounted using a "real" discount rate which reflects the time value of money over-and-above the general rate of inflation.)
- e. Future Benefits and Costs. In projecting future benefits and costs, an allowance for future price-level changes will be made only for particular benefits and costs expected to change at rates higher or lower than the general rate of inflation. In such cases, the rates of change used in the analysis will be the "differential" rates, i.e., the anticipated differences between the actual projected rates of change and the general inflation rate.
- (1) Energy studies: Fuel/energy costs shall have differential escalation rates as published by NIST in Handbook 135 and disseminated as indicated in paragraph 3.a(1) above. All non-energy costs shall have a zero differential escalation rate.
- (2) Non-energy studies: For non-energy studies, the differential rate of future price-level change shall generally be assumed to be zero, except in those cases where there is reliable information/data to the contrary.
- (4) Computer Aided Calculations. All computer aided calculations for MILCON design economic studies will be accomplished using the Life Cycle Cost in Design (LCCID) computer program for economic analysis developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL) or a version thereof which has been certified by CERL as equivalent.

